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# The Physiotherapy Review

Volume 24 Number 1

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JANUARY-FEBRUARY 1944

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The Physiotherapy Review

*Published Bimonthly by The American Physiotherapy Association*

**Volume 24** **JANUARY-FEBRUARY** **Number 1**

# Rehabilitation in the British Army

**Colonel F. S. Gillespie**

The attainment of good physique always has appealed to a certain minority, but for the majority, the popularity of this appeal has varied considerably through the ages.

Since the attainment of good physique is achieved only by strenuous effort and industrious application, it follows that the motive forces energizing the effort and maintaining it must be strong and compelling.

The forces most obvious during war are the importance of physical fitness as a factor in self-preservation and its equal importance in successful aggression. There are numerous examples of the success of the small, highly trained mobile force over the larger force composed of men who are not capable of such sustained effort.

The British Army always has stressed the importance of physical fitness of its men, and during and since the last war we have given considerable thought to making the best possible use of our available man power. During the present war we have been faced with the urgency of mobilizing all our available reserves and conserving as efficiently as possible the men we already have in the Army. The problem of rehabilitation has been a very urgent one.

We have approached it from two angles:

(1) The development of men who were found to be unfit for induction into the Army by reason of some physical defect.

(2) The rehabilitation of men who had been in hospital with wounds, injuries or postoperative conditions which rendered them temporarily unfit for full duty.

To that end two types of unit have been developed: The Physical Development Center and the Convalescent Depot. It was recognized that complete success could be attained only by complete rehabilitation, and the process of mental rehabilitation is equally as important as the physical process. The object in view therefore is an individual who is adjusted both mentally and physically and to that end the program of training at both types of unit contained talks, lectures, education and debates spaced between periods of more active military and physical training.

### The Physical Development Center

The particular aim of the Physical Development Centers has been the working up of substandard recruits who were potentially fit but liable to break down in training if that training was not carefully supervised. The majority of these came from Primary Training Centers but some came from Field Force Units scattered throughout the British Isles and were sent to Physical Development Centers because they could provide excellent graduated training facilities where men could have their physique improved under ideal conditions.

This type of case has responded most successfully to this type of training and the results have been most encouraging not only to the instructors but also to the trainees who have been delighted with their improved physique and general feeling of well-being induced by a course of physical exercise.

Late R. A. M. C.
British Medical Liaison Officer with the United States Army.
Medical Field Service School, Carlisle, Penna.

The trainees are selected in the first place by the unit medical officer and finally are checked by the command specialist in physical medicine before admission to Physical Development Center. On arrival at Physical Development Center they are placed in one of three groups:

*Group "X"*. Poor physique; underweight, underdeveloped; poor posture not caused by malformation; postural abnormalities (kyphosis, lordosis, scoliosis, etc.) caused by muscular unbalance and bad habits; low exercise tolerance; mild effort syndrome; slight bronchial conditions; nervous dyspepsias.

*Group "Y"*. Weak or flat feet due to postural errors; slight cavoid type feet; milder degrees of stiffness in joints of feet; spread anterior metatarsal arches; metatarsalgia; milder degrees of hallux valgus and rigidus and clawed or hammer toes.

*Group "Z"*. Internal derangement of knee joint not suitable for operation and postoperative cases where the quadriceps have not fully recovered; injuries of ankle, shoulder and elbow joints where there is muscular weakness and limitation of joint movement not due to bony change.

A course normally lasts eight weeks and the center has on its staff a specialist in physical medicine, a physical training officer (from Army physical training corps), 34 physical training instructors, a chiropodist, 3 masseurs and a shoemaker. For the military and educational training there are in addition 1 training and administrative officer and 12 drill instructors and 3 educational instructors.

The various groups are exercised by special instructors with specialized exercises for their particular deformities and are graded up into more advanced groups as their disabilities react to training. A keen spirit of competition is encouraged and physical efficiency tests are carried out so that trainer and trainee can see the results. Periodical medical examinations are carried out, and trainees are weighed and measured on arrival, after 21 days and at the end of the course. Each course contained about 125 trainees and the maximum capacity of the center I visited was about 500. Larger centers have since been developed and are getting excellent results. Special attention is paid to the diet, feeding and general welfare of the trainee.

*The convalescent patient* goes through various stages on his journey from complete dependence to complete independence and it is with him that the full implications of rehabilitation are brought into play. By rehabilitation we mean the process by which an individual is restored to fitness after illness or injury, and by fitness we mean not only physical fitness but also mental fitness and restoration of morale and the will to win; the process normally consists of two stages but in certain cases there may be an intermediate stage.

*The FIRST STAGE* takes place in hospital where the disease is cured or injury repaired. During this stage, strict military discipline tends to be relaxed and replaced by encouragement. During this stage physical fitness deteriorates and the muscles become flabby and if this stage is prolonged, morale becomes lowered. During the stage in hospital it is important that early steps towards rehabilitation should be taken. They consist mainly of:

(a) *Occupational therapy* in the wards, especially for bed patients. It should be mainly diversional and is carried out with the cooperation of the medical officer, ward nurse, and visiting handicraft workers when available. Basket, rug and camouflage net-making, practice in receiving and sending for telegraphists, and similar exercises, all of which help to stimulate the physical and mental activities of the patients.

(b) *Physical therapy* which should be carried out by trained masseurs and masseuses under the direction of the medical officer in charge. It is essential that he should visit the department regularly to watch the progress of cases. It is of vital importance that the medical officer and those carrying out treatment should get the fullest confidence and interest from their patients. Reeducation of an injured limb or group of muscles is a tedious and sometimes painful process and it needs the fullest cooperation of all concerned to get the best results. If the physician and attendants show a lack of interest the patient begins to regard his case as hopeless and fails to do his best. Grouping of similar cases provides a spirit of competition in the race for recovery.

Hernia cases are started on suitable abdominal exercises immediately after operation.

Knee joint cases are taught to do exercises for their quadriceps prior to operation so that they may continue them after the operation is completed.

The case with a burned hand is encouraged to carry out movements of his fingers at the earliest possible moment so as to keep the tendons free and avoid that most crippling of all deformities —the claw hand.

In some centers either selected patients or special medical orderlies are detailed as "exercise leaders," men who by their drive and enthusiasm, and where possible by their former prowess at sport, are able to lead, drive, coax or cajole

the men in their ward back to useful function by restoring the feeling of interest which is apt to get lost during a prolonged stay in hospital.

One sergeant pilot in the R. A. F. with two fractured arms, both his hands and all his fingers burned, set a wonderful example to the men of his ward and helped them and himself along the road to recovery.

It is important that patients should be transferred from hospitals to Convalescent Depots as early as possible. As soon as they can help themselves and are not in need of dressings they should be moved from the atmosphere of sickness and dependence on others to the open air surroundings of convalescent depots and return to normality and the feeling that they are once more on the high road to useful function.

*The INTERMEDIATE STAGE,* already referred to, occurs in those cases when there is a special local disability in addition to a general muscular softness. These cases result from injury or disease, such as fractures, sprains, etc., and certain diseases which result in special weakness of certain muscles or muscle groups. These cases require local remedial treatment before they can undertake the general graduated training of a convalescent depot. Remedial treatment is given in the physical therapy department and in the gymnasium, and it consists of massage, active and passive movements, exercises designed to restore tone to and develop wasted muscles, either single muscles or large groups; electrical stimulation, radiant heat, ultraviolet and infrared light, etc. Stiff joints are loosened, weak muscles are strengthened and reeducated, and errors of progression are corrected. A great deal of ingenuity has been brought into play in the production of various types of improvised apparatus to exercise muscles and limbs suffering from loss of function by reason of injury or enforced disuse. The patient is taught how to do exercises to develop muscle groups. Swimming is very valuable in suitable cases as it provides exercise and support at the same time.

There is no clear-cut line of demarcation between the intermediate and final stages; in fact the intermediate stage may not have been necessary at all. The intermediate stage may be spent either partly in special hospitals, convalescent hospitals or in convalescent depots. The patient comes along now to the *SECOND STAGE.*

*The CONVALESCENT DEPOT* and treatment here begins when hospital treatment and specialist supervision are no longer required and the patient is ambulant and capable of looking after himself. In fact, he ceases to be a patient and becomes a "trainee." During this stage he is brought back to military discipline and his physical fitness is gradually restored by carefully graded series of exercises, varying from the most gentle to the most strenuous. Morale is raised by encouraging the competitive spirit and by the sight of other men who have suffered from similar disabilities and are recovering rapidly. The trainee is encouraged to note the progress of himself and others to full health. Men are detailed to companies as they would be in their own units and a keen spirit of competition is fostered at every turn. General smartness, cleanliness of barracks, games, drill, performance on assault course when that stage is reached. In the final stages arms drill is carried out so that the soldier may be physically fit for all duties on his return to his unit. When swimming is available it is a particularly valuable way of exercising the injured limb which is not capable of full weight bearing. Various types of injury are placed in special groups under special instructors so that at one part of the gymnasium you may see a group of men who have had recent operations for hernia undergoing special exercises to build up abdominal muscles. Another group will be building up their quadriceps while a third group is working on exercises to remedy foot deformities.

Those patients who require massage or any form of physical therapy are sent to the well equipped department which can deal with their specific disability under the guidance of a specialist in physical medicine.

Trainees normally stay four to six weeks at the convalescent depot. They are divided into four grades. Grade I is the lowest and includes hernias, orthopedic cases and any others who obviously are not very fit. They are carefully examined each week and graded up as they become fit. Grade IV men start on really strenuous training, including a stiff obstacle course. The fitness of the Grade IV men can be judged by the fact that recently a commando unit training in the neighborhood asked for permission to use the convalescent depot obstacle course. The Group IV trainees watched them, challenged them—and beat them!

The training staff are well equipped with training and physical ability of a high order, combined with boundless enthusiasm, resource and patience. I found my visit to the unit a most inspiring experience and it left no doubt in my mind as to the tremendously beneficial results, mental and physical, of such an organization. If this type of work could be carried on in the days of peace our countries would be benefited beyond our wildest dreams.

# The Physical Therapist Looks at the School Child

**Esther Hutchinson**

A glance at your morning newspaper reveals headlines bearing testimony of the topsy-turvy condition of the world. Even the flavor of your breakfast coffee does nothing to add a note of normality to the picture. It is interesting in these abnormal times to find one healthy, normal note. Picture some of the headlines you have seen—"The Handicapped Help Defense," "Crippled Employed in War Industries," "Hundreds of Handicapped Find Jobs." People are discovering what normal things the handicapped can do. This is healthy, hopeful news.

Why does the story of handicapped people working make feature material for the *Saturday Evening Post?* Chiefly for the reason that while the crippled child makes an emotional appeal to the general public, the crippled adult has been considered just an unfortunate. Perhaps in the past we who have worked with the crippled child have unwittingly promoted such an attitude through segregation which, unless handled carefully, tends to place a premium on being crippled. The child has grown to expect favors and the general public has not learned that the cripple can work at the side of the normal. Throughout the years we have placed too much emphasis on the fact that these people are crippled and not enough emphasis on what they can do.

If the child is to take his place in society as a well-adjusted, self-respecting and economically independent adult, the school must share in a coordinated program with other individuals and agencies interested in the welfare of children. Recognizing this, special education, as conducted today, is no longer so highly "special." It is regular education geared to meet the individual needs of certain children, physically as well as academically. The child with a paralyzed arm or a scoliosis has more in common with the so-called normal child than he has differences. He carries the same academic work, has the same desires and interests as other children and spends his out-of-school time with parents, brothers, sisters and friends. Although normal in most respects there are times when the child's physical disability prevents him from carrying the regular school routine. It is then that we in the schools must help him to secure maximum physical improvement and assure him the same educational opportunities as other children through an enriched program which will round out his field of experience.

Since crippled children vary widely in the extent of their handicaps and in their needs, the special education program is made flexible enough to serve all types of crippled children. Protective care and curative treatment are included when indicated, but are gradually withdrawn as the child gains strength and confidence in his own ability. The educational program may be either in the form of individual instruction given at home or in the hospital, or group instruction in special class, combination special and regular class, or in regular school on a modified program. The end of each year shows a comparatively large turnover in each group, for children are advanced just as rapidly as it is thought advisable by the attending physician. The measure of success of the special program is not how many children are kept under protective care, but how many are prepared for normal living.

In Ohio the crippled child needing special school placement may enter a centralized school housing only crippled children or a special unit in a regular school building. Of the 25 special schools in the state, 20 are located in regular school buildings with normal children.

The centralized schools housing only crippled children are in the larger cities and from the administrative angle have certain advantages, particularly from the point of building arrangement, transportation and attendant care. They also offer greater opportunities for fitting the school to the child. But in fitting the school to the child, one must always keep in mind the fact

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Read before Pre-Convention meeting of the Orthopedic Section of the American Physiotherapy Association with the Therapeutic Section of the American Association for Health, Physical Education and Recreation, Cincinnati, Ohio, April 12, 1943.

that our main objective is fitting the child for normal life. He must receive normal treatment along with his special treatment. This is more difficult to do in a centralized school serving only crippled children, but it can and is being done successfully.

It is believed by many, and this belief is shared by the Division of Special Education, that it is easier for the crippled child to grow normally when he is in association with regular school children. The normal majority group tends to raise the standards of achievement. In orthopedic units, housed in regular school buildings, the child who needs transportation, rest or physical therapy will receive these services the same as in a centralized school, but in addition he has an opportunity to attend regular classes and participate in a program with normal children. His schoolmates of today will be his working companions of tomorrow.

Advocates for the centralized orthopedic school may object on the grounds that the crippled child will not be accepted completely in the regular school. Their point is well taken, for, unless the special and regular teachers share in the responsibility for educating these children, the child may become more isolated than if he were in a special class full time. One superintendent has said, "The regular teacher's attitude should be one not of mere tolerance, but rather of keen interest in guiding his educational and social development. It is her privilege and obligation to do for the child that which the special teachers cannot do, namely, make him feel that though he has a physical disability he is not inferior to normal children in other respects. She is in a position to do much to help him build up confidence in himself by explaining to the regular children the purpose of the special class, striving to develop among regular children a wholesome attitude toward the crippled child, encouraging the crippled child to participate in group activities of the normal grade children, and insisting that he grow in responsibility to himself."

As many orthopedic disabilities in children respond well to treatment, physical therapy has been included as part of the special school program. Although children in the class are given first consideration, in the more rural areas this service has been extended to a limited number of preschool, high school, home instruction, and regular school children. In planning the school day, rest and physical therapy are woven into the program in such a way that the child has the advantage of treatment with a minimum loss of time from his academic work.

The first duty of the physical therapist is to give the massage, light or muscle training which has been prescribed by the child's physician. This may be either to improve function or to prepare for further surgery. Many of the school children are seen by the orthopedist only once in every three or four months. As they outgrow braces and crutches and during their period of growth tend to develop further deformity, it is important that they be watched during these intervals. The physical therapist keeps in close contact with the orthopedists and frequently attends clinic with the children in order to discuss changes in treatment. In a few centers the orthopedists examine children at school.

Another step in rehabilitating the child is to teach him to use what power he has to the best advantage. We are preparing him to go on from the protected class into normal society, and he will need skills and self-reliance. It may be necessary to teach him to feed and dress himself, get in and out of chairs and climb stairs, and this can best be accomplished with practice in actual situations. Most children want to do what other children are doing, and school provides the necessary incentive. He learns to climb stairs so he can go out to class and he feeds himself because other children are doing this. One year a little boy with cerebral palsy entered school, and, although not too badly handicapped, had never learned to dress himself nor was he anxious to start at that time. However, he did love to go in the pool and when he realized that he must at least help with the dressing if he continued, it was no time until he could care for himself.

During the period the child is under close supervision every effort is made to improve his physical condition and general appearance, increase his endurance and instill in him a desire to improve. Of course, the amount of improvement which can be expected will vary with each individual. Most of the children will return to regular school, but some few will never reach a point where they are self-sustaining individuals. For these we also have certain responsibilities. If they can be taught to entertain themselves and care for at least a few of their personal needs, they will be much happier and less of a burden to other members of the family.

This year a class was opened for some of the more handicapped children with cerebral palsy. Badly handicapped children are usually overprotected and Martha was one of these. The whole family life had been built around her and for seven years the parents had watched and wor-

ried over every movement. Martha was unable to attend the local special class, so it was decided to place her in the cerebral palsy unit where she might live in the convalescent home in which the unit operates. You can imagine what it meant to sell the family on the idea of placing her in a school 150 miles from home, and as the family physician was to be consulted, the plan must be presented to him. At first the physician was a bit dubious about the whole thing, but in the end he replied, "I'll do all in my power to help. I don't know how much you can do with Martha, but I believe such a plan might save the married life of a fine young couple. The mother is now on the verge of a nervous breakdown just from worry over the child." Through the efforts of various people in the community Martha entered school in September. The family is now delighted with her school progress, slight physical improvement, and the opportunity she is having to enter into the social life of the group. She will return to a much more stable home in June. The special class is helping to build a more normal life for badly handicapped children and their parents.

Parents are likely to help crippled children too much. Nurses and physical therapists sometimes help parents too much. It is usually easier for the nurse or physical therapist to take the child to clinic and care for brace adjustments than it is to persuade parents to assume these duties. We often hear the nurse or physical therapist say, "But I can get these things done in half the time and I know they're done right." True, but in doing this are we preparing the child and the parents to take over responsibility which may be theirs for many years to come?

We wish to emphasize here, how the physical therapist and special teacher can help in laying a foundation which will aid the child, the parents and the regular teacher in their future planning for care, treatment and education. Many children have had little contact with physicians and hospitals before entering school, and a question familiar to any physical therapist is: "What are they going to do to me?" As some children will need a series of operations and long periods of aftercare, she can help in getting the child's cooperation by explaining briefly what to expect in the hospital and what the aftercare will be. Parents, too, at times are confused. They come to the physical therapist with some such statement as this: "The physician explained what he was going to do, but I didn't understand and was afraid to ask him again." Both parents and children must have a general understanding of what is to be done, and why, if maximum improvement is to be achieved.

It is only within the last few years that children with cardiac disabilities have been included in the special education program and there still is much to be done in this field. From studies made, it is estimated that one to two per cent of all school children have some type of heart disease. Congenital heart disease is more or less stationary, but rheumatic heart disease, which is responsible for 95 per cent of the cardiac disabilities in children, presents quite a different picture. During the active stage, when acute symptoms are present, complete bed rest is indicated, but during the inactive stage, functional ability fluctuates. At times the child may need a greatly restricted program, and then again, his condition may permit only slight limitation or allow him to participate in normal activity.

Most cardiologists and pediatricians are opposed to long periods of school segregation, believing that the child should learn to "live with his heart" and receive protective care only so long as the actual need exists. Parents and physicians frequently differ on the amount of restriction required by the child in school. For a better program parents must be informed on the needs of a child with rheumatic heart disease, and facilities for the examination and care of these children must be placed within the geographical and financial reach of the parents. Children with cardiac as well as orthopedic disabilities should have adequate medical care, a wholesome understanding of their handicap, and be encouraged to participate in physical activity within the limits of their functional capacity.

In regular school, there will be found certain children who would benefit by, but, for various reasons, have never received remedial care. Some of these are discovered by the physician and nurse, and some by the physical education instructors. In a number of cities, the physical therapist and physical education teachers work together in examining and planning activity programs for crippled children. The physical therapist follows those needing intensive individual work, and the physical education teacher, the others—most of whom are able to participate in a modified program. A majority of the school physical therapists have had physical education background. We believe this is desirable, for the girls seem to fit more easily into school routine and, too, they usually are better prepared for carrying on a recreational program.

Sometimes we are asked why there are special classes for crippled children at elementary level and not at high school level. It has been found

that most corrective surgery has been completed by the time the child finishes the elementary grades, and he has then gained self-reliance which will permit him to compete with regular high school pupils even though some adjustment may need to be made in the physical program. The regular high school, with its extensive curriculum, provides more normal educational and social opportunities than could be offered in a special school. If a pupil is too badly handicapped to attend high school, he may continue his education under home instruction.

During his years of schooling, the child is accumulating occupational information. He is learning what people do, first, in relation to the home, then the community, and later to society as a whole. Good educational and vocational counseling will help him to evaluate his abilities and limitations and become interested in those vocations for which he is best suited. When the crippled youth makes more intelligent selections in the field of vocations, there will be fewer employers identifying failure with a physical handicap.

The physical therapist looks at the crippled child. She sees his need for protection and treatment. In looking at the crippled child and his crippled condition, we must always remember his normalities and make his school and life situations as full of normal experiences as possible.

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## Exhibits Available

1. "Reproductions of the Pictures on the History of Physical Therapy":
   8 posters, 22x28 inches, containing 19 reproductions of pictures on hydrotherapy, electrotherapy, massage, exercise, etc., from the earliest times. Posters will be shipped in frames ready for hanging. Weight when packed for shipping 60 pounds.
2. A motion picture film 200 feet long, on "Massage." (16 mm.)
3. "Posture Plays an Important Part in the Physical Therapy of Bed and Convalescent Patients":
   6 posters, 22x28 inches, in frames with photographs showing: good and bad posture of a patient in bed; good and poor posture in a wheel chair; instruction in walking with crutches and with a "walker." Weight when packed for shipping approximately 60 pounds.
4. "Statistical Map" showing schools approved by the American Medical Association, location of American Physiotherapy Association Chapters, Membership, etc. Weight when packed for shipping 46 pounds. This is in pastel colors. Should be displayed on an easel as it is too heavy to hang. Size 45x35 inches.
5. Poster 22x28 on the American Physiotherapy Association. "Requirements for Membership, Curriculum Content, Scope, Membership and Chapter Growth."
6. A motion picture film (16 mm.) "The Maintenance of Neutral Position of Patients with Infantile Paralysis During Nursing Care in the Hospital and in the Home."
7. Poster showing publications of the American Physiotherapy Association individually mounted (with request slips).
8. Poster: "The Nation Needs Physical Therapists."
9. Poster on pool construction and design.

For information regarding these exhibits, write Dorothy Dean, Exhibits Chairman, P. T. Dept., 303 East Chicago Avenue, Chicago 11, Ill.

# Brachial Plexus Injuries

N. Meadoff, M.D., and A. B. Gray, M.D.

Brachial plexus injuries are not only very interesting from a medical viewpoint but important from an industrial one. The cases which have been seen at this hospital in the past year are herein presented with a brief review of the subject in general.

The following etiological classification of brachial plexus injuries is taken directly from Stevens:[1]

"1. Traction
- a. Birth cases.
- b. Blows on shoulder or neck depressing shoulder, or falls stretching head away from shoulder.
- c. Falls when the arm catches, suspending the person at least momentarily, or when the arm is twisted.
- d. Being lifted by the arm as over a pulley, or dragged forcibly by the arm as in case of children jerked by parents leading them by the hand.
- e. Accompanying dislocations or the reduction of dislocations.
- f. Prolonged holding of arm in abduction and external rotation, as in operation.
- g. Slipping while carrying a weight on shoulder.
- h. Sudden movements, as in effort made in trying to lift weights.

"2. Pressure
- a. Dislocation, where shoulder is out for a long time.
- b. Exuberant callus, especially of the clavicle.
- c. Saturday night paralysis, usually radial, terminal.
- d. Crutch paralysis, terminal.
- e. New growth, involving roots, trunks or terminal branches, or secondarily, either from bony, cartilaginous, or soft tissue pressure. (1) Benign. (2) Malignant.
- f. Adventitious rib or bands.
- g. Following aneurysm of the subclavian or axillary artery.
- h. Esmarch bandage or tourniquet.
- i. Degenerative bone lesions of the cervical spine, especially tuberculosis, causing pressure on roots.
- j. Fractures, especially of vertebrae, by direct pressure.

"3. Direct Injuries
- a. Cut or wounds.
- b. Fractures or dislocations causing direct injury.
- c. Injection of the plexus by local anesthetics.
- d. Electric shock.

"4. Toxic
- a. Following serum injections.
- b. Infectious diseases, especially pneumonia.
- c. Following anesthesia, chloroform especially. (These are hard to separate from possible trauma from malposition during the anesthesia, but several cases have been reported where no malposition could have occurred.)
- d. Poisons (as lead), usually peripheral neuritis.

"5. Spinal Cord Lesions
- a. Infection.
- b. Degeneration.
- c. Tumors.
- d. Direct injuries to the cord itself.
- e. Hemorrhage within vertebral canal.

"6. Psychic Paralysis (Hysteria)."

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## Mechanics of Injury

Certain anatomical features must be brought out and emphasized to explain the method of production and the location of brachial plexus injuries.

The brachial plexus nerve roots are held firmly at two points, namely, at the transverse processes by invagination of the prevertebral fascia, and below the clavicle by the clavipectoral fascia to the surrounding structures. The middle or plexiform part of the plexus is surrounded by blood vessels and is the site of hemorrhage, but seldom the site of tension type of injuries.

Early observers believed that brachial paralysis was due to direct pressure on the nerves. The traction or tension theory was offered by Fieux in 1897 in obstetrical injuries, and by Horsley[10] in 1899. The present conception is that the vast majority of injuries occur either as root lesions, or as terminal nerve lesions in the infraclavicular region, *ie.*, at the points of firm attachment.

The cords of the plexus are held in an arch formed by the attachment of the pectoralis minor muscle to the coracoid process. This arch acts as a fulcrum for the neurovascular bundles as the arm is abducted. Adduction and traction cause tension of the brachial plexus over the first rib. In this position the attachment of the scalenus anticus muscle acts as a fulcrum.

Normally the rotation of the scapula while the arm is abducted maintains the fulcrum in a neutral position, but any force which will increase the tension over the fulcrum between the two fixed points, at the transverse process and clavipectoral fascia, could cause injury to the brachial plexus. It is important to know, therefore, both

for diagnosis and prognosis, whether or not the arm was abducted or adducted, and whether or not it was internally or externally rotated.

### INJURIES TO THE LONG THORACIC NERVE

Case 1: A 41-year-old white male electrician was first seen at the clinic on June 12, 1943. About three months previous, while standing on a staging, another worker, stepping over a second staging, struck the patient's head with his shoe, throwing his head to the left. As he reached for the railing with his right hand, he felt pain in his right shoulder. Some transient numbness of the right hand and weakness of the right shoulder were complained of by the patient at the time of injury. The pain and weakness of the right shoulder had persisted to the present time. He denied any previous injury to his neck or shoulder. Examination revealed an obvious winging of the right scapula which became more pronounced on forward flexion of the arm (Figure 1a). Forward flexion was present up to 110 degrees and abduction up to 90 degrees. On pressing the scapula to its normal position, the arm could be flexed forward to 170 degrees (Figure 1b). There was neither muscle atrophy nor weakness in any of the other muscles about the shoulder girdle. The strength of grip and forearm muscles were normal. No sensory changes were noted.

On August 15, 1943, winging of the scapula was still present but the patient was able to abduct his arm to 135 degrees. He has continued doing light work which does not require maintaining his arm above shoulder level.

Case 2: A 19-year-old white male rigger was injured on August 2, 1942, when he fell approximately ten feet, suffering a compression fracture of the fourth lumbar vertebra and fractures of the four upper left lumbar transverse processes. The patient was hospitalized, the compression was reduced, and a body cast applied. The cast was removed on November 20 and a Taylor back brace was substituted. It was apparent at that time that the patient had winging of the right scapula with almost complete paralysis of the right serratus anterior muscle. The other shoulder muscles were intact and well compensated so that there was essentially no weakness of the right shoulder girdle action. About ten months following the original accident the patient was working, with practically no disability evident. However, only about 25 per cent of the normal function of the serratus muscle had returned.

Case 3: A 37-year-old white female was first seen in the orthopedic clinic on May 15, 1943, complaining of a neuritic type of pain about the right shoulder and weakness of the right arm and shoulder. She stated that eight weeks previously, while pulling a welding cable, the line was suddenly jerked, causing a great strain on the muscles of her right shoulder.

Examination revealed a winged scapula on the right side with partial paralysis of the right serratus anterior muscle. There was a slight degree of limitation on abduction and forward flexion of the arm.

*Fig. 1a. Showing winging of the right scapula, and the amount of forward flexion present.*

*Fig. 1b. The same case, showing the amount of forward flexion when the scapula is maintained in normal position.*

This case illustrates the importance of scapular rotation in normal abduction and forward flexion. F. V. Inman and his associates[15] have shown by repeated roentgenograms of normal shoulder motion that there is a direct relationship between the glenohumeral motion and rotation of the scapula; that is, for every 15 degrees of abduction at the glenohumeral joint there is 10 degrees of rotation of the scapula.

The patient was treated with physiotherapy and an abduction splint. Sufficient progress was made by July 5 to enable the patient to return to work. About 50 per cent improvement in function had been obtained.

Stretch injury, the most common type of trauma to the long thoracic nerve, results in iso-

lated paralysis of the serratus magnus muscle. This frequently occurs from punching and missing, pulling hard, forceful swinging, as of a golf club, or from local pressure on the nerve, such as a direct blow, or pressure of a body cast. The main symptoms are weakness of shoulder power and inability to completely abduct the arm. The disability resulting from paralysis of the serratus magnus muscle varies with the type of work done by the patient. Any work which involves much use of the shoulder girdle is contraindicated as it prolongs nerve recovery and permits undue stretching of the paralyzed serratus muscle unless a satisfactory brace is applied.

Many methods of treatment have been adopted. These include braces such as airplane splints, scapular splints to prevent the scapula from leaving the chest wall, and elbow elevating devices to bring the shoulder girdle upward and backward and thus derotate the scapula. General systemic treatment including the use of thiamin chloride is routine, although its efficacy has not been established.

The majority of our patients were first seen a considerable length of time after the original injury. In these cases it was felt that the maximum stretch had already occurred at the time of examination and that the application of braces would not shorten the period of disability. The patients were therefore permitted to continue light work below shoulder level.

Experience reported in the literature shows that in about 80 per cent of cases with paralysis of the long thoracic nerve complete return of nerve function has occurred. The remaining cases have had little disability due to loss of function. The duration of disability cannot be estimated in any individual case and may vary from several weeks to over one year.

### INJURIES TO THE SUPRASCAPULAR NERVE

Case 4: A 23-year-old white male welder first noticed inability to use his left shoulder immediately after doing overhead welding for a full shift. While welding, he supported himself with his left arm, the left elbow being flexed to 90 degrees, the left arm abducted to above 90 degrees and internally rotated. He was first seen 48 hours after the injury. On examination, the patient was unable to abduct or forward flex his left arm more than 30 degrees (Figure 2). During this motion there was no movement at the glenohumeral joint, the arm being carried passively by rotation of the scapula. However, during the motion the deltoid contracted well, and there was some flattening of the supraspinatus fossa. No tenderness was noted in the region of the shoulder joint, but there was one tender area in the posterior middle third of the clavicle along the course of the suprascapular nerve. The other muscles at the shoulder joint were normal. No sensory changes were apparent, and the biceps and triceps reflexes were equal and active bilaterally. Myographic recordings made at the University of California revealed normal muscle activity in the left deltoid, as well as in the right. The left supraspinatus muscle registered a potential of approximately one-fourth of that on the right. X-ray examination of the cervical spine and left shoulder was negative. A diagnosis was made of stretch palsy of the suprascapular nerve resulting in loss of motion of the supraspinatus and infraspinatus muscles. The paralysis caused the loss of fixation of the head of the humerus within the glenoid with the result that the deltoid was not able to abduct the arm. The patient was treated by electrical stimulation and physiotherapy. About two months following the injury he made an 80 per cent recovery of muscle function and was allowed to return to welding, although overhead work was no longer permitted.

Case 5: This patient was seen in the orthopedic clinic on June 23, 1943. He stated that while welding overhead on June 22 his left arm suddenly fell to his side, and he was unable to lift it. At the time of examination his left arm was hanging at his side. Scapular abduction was present up to 25 degrees (Figure 3). Scapulohumeral motion was absent. Passive abduction was nor-

*Fig. 2. Case 4, with paralysis of the suprascapular nerve, showing the extent of active abduction of the left arm.*

*Fig. 3. Case 5, with paralysis of the left suprascapular nerve.*

*Fig. 4. Case 10, with direct injury to the axillary nerve, showing atrophy of the right deltoid muscle.*

mal and deltoid contraction was present. There was no muscle atrophy and no pain. Moderate tenderness was present over the supraspinatus muscle. A diagnosis of a stretch injury to the suprascapular nerve was made, and a sling support to the arm advised. On June 27 there was 60 degrees of abduction with some ability to maintain abduction against gravity when the arm was raised passively to 90 degrees. Three weeks later normal function returned.

We draw attention in these two cases to the presence of a normal deltoid muscle which was incapable of abducting the arm, the reason being that the force of the deltoid muscle exerted could not overcome the weight of the arm, with the absence of action of the infraspinatus muscle to lever the head of the humerus into the glenoid.

### INJURY TO THE SUPRASCULAR AND LONG THORACIC NERVE

Case 6: R. S., a 20-year-old white male developed symptoms in June 1942, after he had worked for two days in rather close quarters swinging a sledge hammer with his right arm. He first noticed pain in the right shoulder area; one week later he discovered that he could not abduct the arm above his head, and that the right scapula was winged. He reported to the orthopedic clinic three months later, at which time there was marked weakness of the serratus magnus muscle with winging of the scapula and associated atrophy and weakness of the supraspinatus and infraspinatus muscles. Further examination revealed no other abnormalities. The diagnosis was made of stretch injury of the long thoracic and suprascapular nerves on the right side. The patient was allowed to continue light work, and the muscle was treated with physiotherapy and electrical stimulation. Slow progressive improvement was noticed after six months, and at the end of a year there was complete return of normal function of all the involved muscles.

The above three cases are further examples of stretch injuries to collateral branches of the brachial plexus. The mechanism of injury cannot always explain the site of injury, and it can only be suggested that the collaterals, which are smaller than the main plexus roots, are more susceptible to trauma.

### POSTOPERATIVE BRACHIAL PLEXUS PARALYSIS

Case 7: A 48-year-old white male rigger sustained a compression fracture of the tenth dorsal vertebra, and fracture of the right seventh and eighth ribs on February 6, 1943. On February 18, under gas-oxygen anesthesia, in the prone position with the patient's arms above his head, the compression fracture was reduced and a cast applied.

On awakening, the patient complained of pain in the right shoulder, with inability to abduct the shoulder or to actively extend or flex his elbow, wrist, or fingers. A two-inch area of hypesthesia over the axillary nerve distribution, and numbness of the entire hand, were noted. A diagnosis of a stretch injury of the entire brachial plexus was made. The next day the patient was able to move his fingers and flex the wrist. Numbness remained only in the thumb and in the deltoid region of the shoulder. Flexion and extension of the elbow and wrist were normal on the third day, but the shoulder condition remained unchanged. This was treated by the application of an abduction splint, physiotherapy, and muscle stimulation. After a refractory period of about three and one-half months, rapid return of function occurred, and in about three weeks 80 per cent of the muscle function was present. When the body cast was removed and a Taylor brace applied, it was noted that the serratus magnus muscle on the right side was mildly paralyzed. It must be assumed that the long thoracic nerve was also involved in the injury to the brachial plexus.

Postoperative brachial plexus paralyses are rarely reported. These preventable injuries have been reviewed by Clausen,[2] and more recently by Wood.[3] Clausen, in his review, brings out an important factor: during anesthesia the musculotendenous protection to exaggerated positions is absent so that an increase in tension on the plexus can easily occur. This is evident in the following positions: if the patient is placed in the Trendelenberg position with wrists strapped, or if the clavicle is depressed in the infraclavicular space by the shoulder braces, or if in addition to the above, the arm is abducted and externally rotated as for a venoclysis. In all these positions a tension injury can occur in the brachial plexus.

The case presented is an example of an injury occurring with the arm in extreme abduction. Here again it was noted that the larger roots recovered quickly, and the collaterals showed the slowest recovery. It is suggested that an equivalent force which will cause a partial transient paralysis of the larger roots will produce a greater damage to the small collateral roots; *e.g.*, the suprascapular and long thoracic nerves.

### BRACHIAL PLEXUS INJURY FOLLOWING SHOULDER DISLOCATION

Case 8: This 46-year-old white male was seen in the orthopedic clinic on April 17, 1943, five days after reduction of a dislocation of left shoulder at another hospital. On examination there was 30 degrees of scapular abduction but no motion at the glenohumeral joint. His arm, which showed a mild edema of the hand and fingers, hung extended at his side. He could not flex or extend the elbow, wrist, or fingers against gravity. Some numbness was noted over the volar aspect of the forearm. A roentgenogram of the left shoulder revealed a minute bony fragment inferior to the glenoid with the head of the humerus in the normal position. A diagnosis of postdislocation injury to the brachial plexus was made. A sling and physiotherapy were ordered. The patient has failed to return for a follow-up examination.

Case 9: A 28-year-old Negro was first seen in the orthopedic clinic on July 2, 1943, with an acute anterior dislocation of the left humerus at the left shoulder joint. The dislocation was easily reduced by the Kocher method without anesthesia, and a Velpeau binding applied. The patient was seen five days later, at which time the binding was removed and active motion was advised. How-

ever, it was noted that the patient was unable to abduct his arm to any degree. Examination revealed a complete paralysis of the left deltoid muscle with an area of skin anesthesia corresponding to the sensory distribution of the axillary nerve. A diagnosis of stretch paralysis of the axillary nerve was made. It could not be determined whether or not there was an associated tear of the supraspinatus tendon. The patient was placed in an abduction splint and physiotherapy instituted. Six weeks later the patient had made a complete recovery.

The brachial plexus or some of its branches may be stretched or torn by depression of the shoulder in dislocation at the shoulder joint. In addition it may be stretched over the head of the humerus, or directly traumatized by the head of the humerus. This is especially true of the axillary branch because of its intimate relationship with the upper end of the humerus. In any difficult reduction, injury to the axillary nerve may occur. As the trauma causes severe pain in the shoulder, inhibiting motion, a case of deltoid paralysis may not be noted for several days. It has also been stated that trauma directly to the deltoid may cause a temporary paralysis of the muscle. An associated tear of the inner muscular cuff may be obscured at first by the effects of the trauma; therefore, it is advisable in all post-reduction cases with loss of abduction, to splint the arm at right angles until the traumatic reaction subsides. Further treatment in the absence of a cuff tear, consists of physiotherapy to prevent adhesions about the shoulder joint and to develop the supplementary abductor muscles. The prognosis varies with the extent of nerve damage, but recovery is the rule if the nerve is not severed.

### DIRECT INJURY TO THE AXILLARY NERVE

Case 10: A 26-year-old white male was injured April 10, 1943, when he fell 20 feet onto the deck of a ship. He suffered a mild concussion, laceration of the scalp, and scattered bruises which included a contusion of his right arm. Recovery was rapid, and on April 14 his only complaint was a sensation of numbness over the right deltoid area. Examination on that date revealed an area of hypesthesia two by three inches in size over the middle of the right deltoid area. Muscle power was normal; however, ten days later there was definite weakness of the right deltoid, which increased and became associated with deltoid atrophy. We lost contact with the patient during the next three months. Four months following the injury he returned, and examination revealed about 50 per cent atrophy of the right deltoid muscle (Figure 4). The other muscles of the shoulder group were normal. The deltoid did not contract voluntarily or with electrical stimulation. The area of hypesthesia was unchanged. Abduction was present up to 85 degrees with the arm in internal rotation and 170 degrees with the arm in external rotation. Internal rotation was limited by 15 degrees. All other motions were normal. Treatment, consisting mainly of physiotherapy, was reinstituted.

Isolated traumatic paralysis of the deltoid muscle has rarely been reported in the literature. Staples and Watkins[4] have recently pointed out that paralysis of the axillary nerve may be easily overlooked before atrophy occurs, because the supplementary muscles of abduction may take over the full function of the deltoid. With the arm in external rotation the long head of the biceps, the pectoralis major, and to some degree the coracobrachialis, become accessory abductors and can bring the arm out to 90 degrees with but slight loss of power. These muscles cannot act with an internally rotated arm. In this instance, however, the inner cuff muscles of the humeral head, especially the supraspinatus and infraspinatus, can carry out abduction of the glenohumeral joint to about 90 degrees. This has been well illustrated in two cases reported by Staples and Watkins, and is also well illustrated in this patient. It can thus be seen that the most important element of treatment is muscle re-education to develop supplementary function. If there is actual severance of the nerve, end-to-end suture is reported as difficult or impossible because of the short course of the nerve. However, with a traumatic neuritis, recovery may be expected within six to twelve months. The final disability should be minimal if adequate supplementary muscle function is developed.

### AVULSION OF THE BRACHIAL PLEXUS

Case 11: A 31-year-old male entered the Samuel Merritt Hospital on March 20, 1942, with the history of a 500-pound barrel of oil having fallen from a height of about fifteen feet, striking him on the head and on the left shoulder, rendering him unconscious for a short time. On examination his blood pressure was 120 mm. of mercury systolic, and 80 mm. diastolic, and his pulse rate was 120 per minute. There was a jagged laceration in the left temporal region extending through the galea, and a rupture of the temporal muscle at its origin. The left arm and shoulder presented a marked swelling and hematoma in the supraclavicular region, with a complete flaccid paralysis of the entire left upper extremity, including loss of motion and sensation. Follow-up roentgenograms showed a compression fracture of the fifth dorsal vertebra, and fracture of the upper left third, fourth, fifth, sixth, and seventh ribs. At the time, all deep reflexes were absent except the ankle jerks, which were present and equal. Treatment consisted of the application of a body jacket, and suspension of the arm in traction.

Examination made on April 15 revealed that the patient's cranial nerves were subjectively and objectively negative. A Horner's syndrome was absent. Since he was encased in a body cast complete examination was extremely difficult. The left arm had been placed in a traction splint for support, which when removed showed the following: an absence of all reflexes, except a weak radial reflex, beginning generalized atrophy which was more than one would expect from disuse alone, absolutely no power in the muscles of the upper arm, the forearm, or the intrinsic muscles of the hand. It was difficult, because of the cast, to determine the motor power of some of the posterior scapular muscles, but

by palpation beneath the cast it appeared that there was still some function of the posterior and superior scapular muscles, including the subscapularis, the dorsiscapuli, the rhomboids, and the latissimus dorsi. Sensation of the left arm showed the following: complete loss of all modalities including pain, temperature, touch, vibration, joint and muscle sense of the upper left extremity from the elbow down; a small band of normal sensation corresponding to the first and second dorsal segments in the mesial aspect of the arm. There was also a small area of normal sensation just to the lateral side of the deltoid region. The abdominal reflexes could not be tested. The cremasteric reflexes were present and equal. The knee jerks were present with reinforcement, but sluggish. The ankle jerks could not be elicited. There was no incontinence.

It seemed probable that there was an avulsion of the roots of the cervical plexus on the left side. There was, however, some sparing of a few fibers which subserve the motor distribution to the posterior scapular group of muscles. There was apparently no regeneration, no evidence of recovery of motor or sensory function in this extremity. There was no unusual pain above the scapular region or in the axilla to indicate gross hemorrhage which would account for the condition found. Surgery was not believed indicated at that time and it was thought quite likely that no particular medical or surgical care could relieve the condition, which would probably be permanent.

On July 13, 1942, reexamination of the left upper extremity showed paralysis of all of the muscles of the left shoulder girdle except the trapezius muscle. The shoulder girdle muscles were all atrophic, though no fibrillary twitchings were noted. The rhomboid muscle was paralyzed and atrophic also. There was a paralysis of all of the muscles of the upper arm and forearm with marked atrophy and fibrillatory twitchings. There was a complete paralysis of the intrinsic muscles of the hand, with a slight amount of wasting. There were active muscle reflexes when the muscles were percussed in the deltoid, biceps, triceps, brachioradialis, and extensor muscles of the forearm. The other paralyzed muscles did not have the active muscle reflexes. There was a total anesthesia over the cutaneous distribution of the fifth, seventh, and eighth cervical, and first thoracic nerve roots on the left side. Over the sixth cervical nerve root distribution there was a patchy anesthesia. All of the reflexes in the left arm were absent. There was a slight limitation of passive motion in the shoulder, elbow, wrist, and finger joints which was undoubtedly due to disuse. There was a slight cyanosis and some swelling of the hand and lower forearm. There was slight tenderness over the left brachial plexus and the neck. The right upper and both lower extremities were essentially negative.

Two months later, on September 21, the patient was reexamined and no material change was noted in the left brachial plexus paralysis. There were very faint contractions in a single muscle fasciculus of the left biceps. Otherwise, no contractions were seen in any of the other paretic muscles. There was no sign noted of any return of sensation and it was believed that the anesthesia which was rather patchy over the distribution of the fifth and sixth cervical roots was, at the time of this particular examination, practically complete.

After careful consideration of the problem, it was believed that the wisest procedure to follow would be that of amputation of the arm. Judging from the distribution of the anesthesia and paralysis, it was believed that this man's injury to the cervical roots was probably at the point of exit from the dural sheath in the intervertebral foramina. The technical difficulty of exposing the area and the chances of being able to improve his condition precluded any justification for nerve surgery from our standpoint. Therefore, on January 6, 1943, an amputation of the left arm at the level of the surgical neck of the humerus was performed, and the patient made an uneventful recovery from the operation.

This case illustrates avulsion of the plexes roots, one of the rare injuries to the brachial plexus. This complication is usually prevented by the fact that the surrounding musculotendinous structures absorb much of the stress before the force is transmitted to the plexus. An associated hemorrhage involving mainly the plexiform portion of the plexus may occur. It was present in this case and was responsible for the supraclavicular ecchymosis.

We believe that this man's injury to the brachial plexus occurred at the point of exit of the dural sheath in the intervertebral foramina. This type of injury is extremely rare and Stevens, after a careful survey of the literature, found only four authentic cases which had been verified by operations.

The results of surgical treatment of these severe plexus lesions are disappointing. Surgical approach is difficult and even if regeneration of the nerve fibers does occur, the nerve pattern may become so distorted as to make the arm useless. The main indication for surgical interference is in the late cases where symptoms are due to the scar formation about the nerves.

## THE SCALENUS ANTICUS SYNDROME

The scalenus anticus syndrome which is characterized by neurocirculatory compression, occurs either following trauma, or in diseases about the shoulder girdle or the cervical spine. Injury, with resultant irritation of some of the nerve fibers that supply the scalenus muscles, results in contraction and elevation of the first rib. "The symptoms therefore are produced by squeezing of the lower trunk of the brachial plexus and the subclavian artery between the posterior and lateral borders of the scalenus anticus muscle and the body of the scalenus medius muscle."[13]

The above is the usual description given for the cause of the scalenus anticus syndrome, yet it is hard to visualize how compression of the solid cords between muscles could influence or cause the symptoms described. We suggest that the mechanism involved is a stretch mechanism, as in other brachial plexus injuries. That is, the irritation which sets off the contraction or contracture of the scalenus anticus muscle, results in elevation of the first rib. With the arm adducted

or at the side, the scalenus anticus muscle and the first rib acts as a fulcrum on which the brachial plexus is stretched. We believe that the operative sectioning of the scalenus muscle results in relief simply because the first rib is allowed to fall.

Sperling and Glenn, in their examinations of cases of scalenus anticus syndrome, suggest a long inspiration to be held while the pulse is examined, which would also increase the elevation of the first rib; this further bears out our contention.

In cases where a cervical rib is present, the chances of producing tension on the brachial plexus is further heightened by increasing the actual distance between the transverse process and the clavipectoral fascia, the points of firm attachment of the plexus.

We have no operated cases with this condition to report.

### BRACHIAL PLEXUS LESIONS DUE TO SERUM NEURITIS

Case 12: A 26-year-old white male suffered a severe infrapatellar laceration on December 27, 1942, and was adequately treated at the hospital for this injury. At that time he was given 1500 units of tetanus antitoxin prophylactically. About one week later he developed extensive hives which cleared up in about five days. Fourteen days after the injection the patient noted a rather sudden onset of pain about the right shoulder girdle. No abnormal findings in the physical examination were evident at that time. The pain persisted to some degree, but no further symptoms were noted until about thirty days following the injection, when the patient returned to his usual work using a sledge hammer, and immediately noticed weakness of his right shoulder. When he was seen 30 days later, a complete paralysis of his right serratus magnus muscle with marked winging of his right scapula was revealed. Soon afterwards, the patient exhibited weakness and slight atrophy of his infraspinatus and supraspinatus muscle. The atrophy became rapidly pronounced (Figure 5). Four months later there was marked atrophy of all three muscles. Abduction at the shoulder was up to 120 degrees, forward flexion up to 75 degrees. There were no sensory

*Fig. 5 (a and b). Case 12, with serum neuritis, showing the marked winging of the right scapula and atrophy of the supra- and infraspinatus and serratus anterior muscles.*

*Fig. 6. Case 13, with arsenical neuritis, showing the degree of abduction of both arms and the atrophy of both deltoid muscles.*

changes, and the other muscles of the shoulder group were normal. Complete clinical, laboratory, and X-ray examination were negative. Treatment has consisted of physiotherapy, electrical stimulation, and the application of an abduction splint, with no return of function in seven months.

This case illustrates the rather typical picture of neuritis as part of a serum reaction. The condition is not common, as only 115 authentic cases had been recorded between the original report in 1909 by Gardere and Gangolphe, and the reviewing of the literature by Bennett[11] in 1939. It may occur following administration of any serum, but most commonly follows the administration of antitetanic serum. Any part of the nervous system may be involved irrespective of the site of inoculation or the severity of the serum sickness, but the most common site is the brachial plexus, especially the fifth and sixth cervical roots, resulting in a paralysis of the Erb-Duchenne type. There are no known predisposing factors and the mode of action of the serum is little understood. It is believed that first a hyperemia and edema of the nerve occurs. Later secondary pressure, from the body framework through which the nerve roots pass, causes the paralysis. The symptoms usually start at the height of the serum sickness, with pain of a neuritic type; and if the condition progresses a peripheral flaccid type of paralysis occurs. With absorption and resolution, recovery in from three to eighteen months is the rule, with about 20 per cent of cases having residual symptoms. If recognized early, vigorous dehydrating measures may be of value. Otherwise the accepted treatment is by orthopedic splinting, physiotherapy, and thiamin chloride.

### Bilateral Suprascapular and Axillary Nerve Paralysis Due to Chronic Arsenical Poisoning

Case 13: A 42-year-old white male was seen in the out-patient department on May 26, 1943, with a history of pain in the left lower arm for one day, which during the night spread to the shoulder, then to the right shoulder. In the morning he was unable to lift either arm.

On examination the patient had about 30 degrees of abduction on each side due to scapular rotation. No contraction was noted in the deltoids. The deltoids, supraspinatus and infraspinatus areas were tender. Motion of the elbow, wrist, and fingers were normal, reflexes were present, and no sensory changes were evident. The general examination was otherwise essentially negative.

Roentgenogram of the cervical spine showed a mild arthritis. The Wassermann and Kline tests were negative, and the urinalysis and blood count were within normal limits. The patient was admitted to the hospital with a diagnosis of peripheral neuritis of undetermined etiology.

On reexamination, July 9, a marked atrophy of the deltoids, and of the supra- and infraspinatus muscles on both sides, was apparent (Figure 6). Abduction was still limited to 30 degrees.

The urine was examined for arsenic at the University of California Hospital and was found to contain 33 micrograms per 100 cc. (upper limit of normal content is 10 micrograms per 100 cc.). Further careful questioning revealed no definite course of arsenic exposure except for the presence of ant paste near the household utensils. His wife had also suffered from occasional paresthesias around her shoulders.

Arsenic is not frequently considered as a cause of peripheral neuritis, the reason being that in most cases of chronic arsenical poisoning, the source of the arsenic cannot be traced. Hassin[10] reported six cases, in none of which was the source of the arsenic discovered. M. Scott and E. E. Aegerter[9] called attention to the similarity in the microscopic changes in the peripheral nerves, spinal cord, and brain in cases of vitamin B deficiency and chronic arsenical poisoning. The essential change noted was a demyelination of the nerve fibrils. Velter, Aring, and Spies further emphasized the relationship between arsenical poisonings and vitamin deficiency. They treated a case of acute arsenical poisoning complicated by peripheral neuritis with vitamin $B_6$, alphatocopheral and thiamin chloride. The most spectacular results were noted when vitamin $B_6$ in conjunction with 50 mg. alphatocopheral was given intramuscularly three times daily. Thiamin chloride was entirely ineffective.

We would, therefore, conclude that any case of peripheral neuritis not responding to adequate treatment should be investigated for chronic arsenical poisoning.

### Isolated Nerve Paralysis in Relation to Normal Shoulder Motion

The cases just reviewed have additional interest in that they serve to illustrate and corroborate certain facts that are already well established regarding the mechanics of shoulder motion. These facts may be summarized:

1. Abduction of the arm is not possible without the action of the supra- and infraspinatus muscles despite an intact deltoid muscle at the same shoulder (Case 4). The infraspinatus is especially important for without its action in fixing the humeral head at the glenoid, the head rides upward and abduction is ineffective.
2. Complete range of abduction is possible in the presence of a nonfunctioning deltoid muscle if the supplementary muscles are intact (Case 10).
   (a) With the arm in external rotation the long head of the biceps, the pectoralis major, and to some extent the coracobrachialis, act as partly efficient abductors.

(b) With the arm in internal rotation the scapular muscles, together with the supra- and infraspinatus muscles, may act as completely efficient abductors.

3. With loss of function of the serratus magnus muscle, abduction and forward flexion of the arm are incomplete (Case 1).

## SUMMARY AND CONCLUSIONS

1. A varied group of brachial plexus lesions as seen in an industrial practice over a period of one year has been presented.
2. The majority of lesions have been produced by stretch injuries to the brachial plexus. In these cases the prognosis is good.
   These include injury to:
   (a) the long thoracic nerve (Cases 1, 2, 3);
   (b) the suprascapular nerve (Cases 4 and 5);
   (c) the suprascapular and long thoracic nerve (Case 6);
   (d) the entire brachial plexus, following reduction of a compression fracture of a lumbar vertebra (Case 7);
   (e) the axillary nerve, following dislocation of a shoulder (Case 9);
   (f) the axillary nerve, by direct trauma (Case 10);
   (g) the entire plexus, following a shoulder dislocation (Case 8);
   (h) and an example of avulsion of the roots of the brachial plexus terminating in an amputation at the shoulder (Case 11).

   The treatment of these brachial nerve injuries on the whole has been conservative with physiotherapy and faradic stimulation.
3. One interesting example of postserum neuritis has been presented (Case 12), which resulted in paralysis of the serratus magnus and supra- and infraspinatous muscles.
4. An unusual case of bilateral deltoid paralysis due to chronic arsenic poisoning has been included (Case 13).
5. Studies of shoulder motion in these patients with paralysis of isolated muscles or groups of muscles which act on the shoulder joint, offer interesting corroboration of the mechanics of shoulder motion.
6. It is suggested that the scalenus anticus syndrome is caused by a stretch mechanism of the neurovascular bundle over the elevated first rib, due to the shortened scalenus anticus, and at times the scalenus medius muscle.

## BIBLIOGRAPHY

1. Codman, E. A.: The Shoulder, Thomas Todd Co., Boston, Mass.
2. Clausen, E. G.: Postoperative Paralysis of the Brachial Plexus, Surg. 12:933, 1942.
3. Wood, D. A.: Injuries to Nerves During Anesthesia, Calif. Western Med. 53:267, 1940.
4. Staples, O. S., and Watkins, A. L.: Full Active Abduction in Traumatic Paralysis of the Deltoid, Bone & Joint Surg. 25:85, 1943.
5. Jones, Sir Robert: Orthopedic Surgery, Oxford Univ. Press, London, England, 1921.
6. Polloch, L. J.: Accessory Muscle Movement in Deltoid Paralysis, J.A.M.A. 79:526, 1922.
7. Polloch, L. J., and Davis, Loyal: Peripheral Nerve Injuries. Paul B. Hoeber, Inc., New York, 1933.
8. Vetter, E. W., Aring, C. D., and Spies, T. D.: A Case of Arsenic Peripheral Neuritis, Treated with Synthetic Vit. $B_6$ and Alpha Tocopherol, J.A.M.A. 115: 209, July 20, 1940.
9. Scott, M., and Aegerter, E. E.: Possible Etiologic Role of Arsenic in Disturbances of the Central Nervous System Attributed to Avitaminosis, Arch. Neur. Psych. 43:356, 1940.
10. Hassin. G. B.: Symptomatology of Arsenical Polyneuritis, J. Nervous Mental Diseases, 72:628, 1930.
11. Bennett, A. E.: Horse Serum Neuritis, J.A.M.A. 112:590 (Feb. 18) 1939.
12. Young, F.: Peripheral Nerve Paralysis Following Uses of Various Serums, J.A.M.A. 98:1139 (April 12) 1932.
13. Reichert, F. L.: Compressions of Brachial Plexus; Scalenus Anticus Syndrome, J.A.M.A. 118:284, 1942.
14. Shallow, Thos. A.: Traumatic Lesions of the Brachial Plexus, Ann. Surg. 92:182, 1930.
15. Inman, V.: Twentieth Annual Conference of the American Physiotherapy Association. Stanford University Press, 1942.
16. Fieux; Horsley, cited by Codman.

## Reprints

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# Schools Approved for Training Physical Therapy Technicians

***By Council on Medical Education and Hospitals of the American Medical Association***

| Name and Location of School | Entrance Requirements* | Emergency Course | | | | Regular Course | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Length in Months | Classes Start | Tuition | Certificate, Degree, Diploma | Length in Months | Classes Start | Tuition | Certificate, Degree, Diploma |
| Army and Navy General Hospital, Hot Springs National Park, Ark. | b | 6 | Oct | None | Certificate | .. | ..... | .... | ..... |
| Children's Hospital, Los Angeles[1] | a-b-c | 6 | FebAug | $200 | Certificate | 12 | FebAug | $200 | Diploma |
| College of Medical Evangelists, Los Angeles[1] | a-b-c | .. | ..... | .... | ..... | 12 | JanJuly | $200 | Certificate |
| University of California Hospital, San Francisco[1] | a-b-c | .. | ..... | .... | ..... | 12 | Feb | $150 | Certificate |
| Stanford University, Stanford University, Calif[1] | a-b-d[2] | 7 | Quart. | $286 | Certificate | 10 | Quart. | $401 | Cert. or Degree |
| Fitzsimmons General Hospital, Denver | b | 6 | Oct | None | Certificate | .. | ..... | ..... | ..... |
| Walter Reed General Hospital, Washington, D. C. | b | 6 | Quart. | None | Certificate | .. | ..... | ..... | ..... |
| Northwestern University Medical School, Chicago | a-b-d | . | ..... | .... | ..... | 9 | JulyOct | $200 | Certificate |
| State University of Iowa Medical School, Iowa City | b-c | 6 | MarSept | None | Certificate | 9 | MarSept | None | Certificate |
| Bouve-Boston School of Physical Education, Boston | HS | Given in conjunction with Harvard | | | | 3-4 yrs. | Sept | $400 yr. | Dipl. or Degree |
| Harvard Medical School, Boston | a-b-c | 6 | June | $200 | Certificate | 9 | June | $250 | Certificate |
| Boston University Sargent College of Physical Education, Cambridge, Mass. | a-b-c | .. | ..... | .... | ..... | 24 | JanOct | $435 yr. | Cert. & Degree |
| University of Minnesota, Minneapolis[1] | a-b-c[3] | .. | ..... | .... | ..... | 12 | Summer | $112[4] | Certificate |
| Mayo Clinic, Rochester, Minn.[1] | a-b-c | 6 | JanJuly | None | Certificate | 9 | JanJuly | None | Certificate |
| Barnes Hospital, St. Louis | a-b-c | .. | ..... | .... | ..... | 9 | Oct | $200 | Certificate |
| St. Louis University School of Nursing, St. Louis[1] | HS | .. | ..... | .... | ..... | 4 yrs. | JanSept | $250 yr. | Cert. or Degree |
| O'Reilly General Hospital, Springfield, Mo. | b | 6 | Oct | None | Certificate | .. | ..... | .... | ..... |
| Hospital for Special Surgery, New York City[1] | a-b-c | .. | ..... | .... | ..... | 9 | Sept | $300 | Diploma |
| New York University, New York City[1] | a-b-c | .. | ..... | .... | ..... | 9 | FebSept | $396 | Cert. & Degree |
| Duke University School of Medicine, Durham, N. C. | a-b-c | . | ..... | .... | ..... | 9 | Sept | $200 | Certificate |
| Cleveland Clinic Foundation Hospital, Cleveland | a-b-c | .. | ..... | .... | ..... | 9 | Sept | None | Certificate |
| D. T. Watson School of Physiotherapy, Leetsdale, Pa.[1] | a-b-c | 6 | JanJuly | $200 | Diploma | 12 | July | $200 | Diploma |
| Graduate Hospital of the University of Pennsylvania, Pa.[1] | a-b-c | .. | ..... | .... | ..... | 12 | Sept | $200 | Certificate |
| Brooke General Hospital, San Antonio, Tex. | b | 6 | Oct | None | Certificate | .. | ..... | ..... | ..... |
| Richmond Professional Institute, Richmond, Va. | a-d[5] | .. | ..... | .... | ..... | 9-12 | Sept | $200-220 | Certificate |
| University of Wisconsin Medical School, Madison[1] | a-b | 6 | FebSept | $96[4] | Certificate | 12 | Sept | $96[4] | Certificate |

* Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; HS = High school graduation.

1. Male students are admitted.
2. High school graduates accepted for a four-year course leading to A.B. degree; students admitted quarterly and tuition is $143 per quarter.
3. Medical technology graduates with B.S. degree also admitted.
4. Nonresidents charged additional fee.
5. Those with degree from other colleges also accepted.

# The Physiotherapy Review

*Editor-in-Chief:* MILDRED ELSON
*Business Manager:* HAZEL PUTMAN
*Associate Editors*
GERTRUDE BEARD
LOUISE REINECKE
BESS SEARLS

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## What's New?

During war time developments in all fields take place so rapidly that we scarcely can keep apace. We read of the house of tomorrow, the automobile of tomorrow, the new rocket planes and on *ad infinitum*.

What is the physical therapy of tomorrow? The urgency of war affects our profession as well as those of engineering. Technics are being improved so that the period of convalescence is shortened. Research will take the guesswork out of physical therapy. How much can a muscle perform? How much or how little heat do we need to apply? The application of cold—refrigeration—is being perfected. Soon it will no longer be: "Give the patient a little heat, some massage and a lot of exercise and see if that doesn't help," but an accurate prescription of temperature, length of time for massage and amount of exercise will be written.

The National Foundation for Infantile Paralysis has spent and is spending thousands of dollars on research on the effects of physical therapy on muscle. To have accurate data on this means a great deal to us as individuals and as a profession, and we are greatly indebted to the National Foundation for its splendid work.

The tremendous strides which our profession has made since World War I can be realized only by those who were in the field of physical therapy during that period.

What's new? Something each day. We hope to report to you through papers in the Review, as we can, on what is being done for our wounded—but the rest will have to wait until that tomorrow which we hope will soon be here.

## Twenty-Second Annual Conference

The 22nd annual conference of the American Physiotherapy Association will be held in New York City, May 17 to 21, 1944, at the Pennsylvania Hotel. The theme of the conference is to be "Rehabilitation." The conference promises to be a most interesting one—so make plans now to attend!

## Chapter Relations

On December 4, 1943, a letter was sent to each chapter president from your National Chapter Relations Chairman, with the request that she refer it to the local Relations Chairman. If your president has not referred this letter to you, ask her for it!

The following are suggestions of contacts that an active Relations Chairman might make to further good relations.

A. Regarding publicity:
   1. See that information pertaining to the local and national organization is supplied to Chambers of Commerce, Better Business Bureaus, and similar organizations.
   2. Send information pertaining to the local and national organization to your State Medical Board.
   3. Send notices and reports of meetings and social affairs to your local newspapers, so that they may appear therein.

B. Relations with physical therapy students in schools within your area:
   4. (a) Invite students to chapter meetings.
      (b) Invite students to your social affairs.
      (c) Give arm insignia to students when they graduate.
      (One chapter already does this.)

C. Contacts with members in the service:
   5. Keep in contact with nearby camps to learn of the arrival of new physical therapists.
   6. Invite girls who are in the service, and stationed in your local area, to meetings and other activities.
   7. Suggest to the program chairman that she plan to have at least one meeting at either an Army or Navy Hospital.
   8. It would be a nice gesture if an old chapter (one which a member has left upon entering the service) should notify the new chap-

ter that one of their members is now located in the latter's area.

D. Within the chapter:

9. Suggest that chapter officers regularly give reports at chapter meetings. The officers know all about the plans and activities of the Executive Committee and chapter, but the general membership should also. They are interested in their own organization!

10. Chapters might find it helpful to have a social committee. Example: The Illinois chapter's consists of: (1) the Membership chairman, (2) an old member, and (3) a recent graduate or new member. The relations chairman might sponsor such a project.

In the next issue we hope to have brief reports from three chapters, telling what they have done so far this year in the way of "Relation" activities.

Submitted by:

(Mrs.) MARGERY L. WAGNER,
Chapter Relations Chairman.

**The Editorial Board regrets very much the delay in the printing of recent *Reviews*. This matter has been beyond our control due to difficulty in printing, but we believe that we now have corrected this situation and that future issues should reach you on time.**

**We are making a special effort to get a *Review* to every member, particularly those overseas. If we could be informed of changes of APO numbers through someone in the United States, it will assist greatly in getting your *Reviews* to you without difficulty.**

## Easter Seals

The annual sale of Easter seals (from March 9 to April 9) this war year of 1944 comes as a reminder of the problem of the crippled youth of America—a problem which is underlined by the nature of the times. The Easter seal has come to symbolize the complete and ideal program for the adjustment and restoration of handicapped children to a normal and happy life. This program, which requires many agencies, both public and private, to effect, consists of five main points. These are an opportunity for the child to get well, to go to school, to play with other children, to learn a trade or profession, and to work for a living. In short, they constitute the same list of opportunities America asks for all of her children. The growth of the annual Easter seal sale, sponsored by the National Society for Crippled Children, reflects the public desire that this work continue and flourish. This year as never before we should support the work of the voluntary service organization. The sale of Easter seals offers an opportunity for all citizens to share in the important job of building crippled children into happy and useful men and women.

## New Members

**The following are new members of the American Physiotherapy Association whose applications were approved on December 13, 1943. All are provisional members-at-large, unless otherwise noted:**

Becklund, Laura, 1906 Third Avenue South, Minneapolis, Minn.

Burritt, Barbara F., 215—15th Ave. Southwest, Rochester, Minn. (Active)

Hill, Lt. Patricia Jean, Barnes General Hospital, Vancouver, Wash.

Mann, Mrs. Edna Henley, 1909 Pettigrew St., Durham, N. C.

Nichols, Millicent E., 612 Garfield Ave., Jermyn, Pa.

Northrop, Dorothy L., Bridgewater, Conn.

Reynolds, Lt. Norma Vern, Station Hospital, Camp Hood, Tex.
Vaughn, Helen H., Warm Springs Foundation, Warm Springs, Ga. (Active, Georgia Chapter)

*Class from Walter Reed Hospital:* (Address for all: Army Medical Center, Washington, 12, D. C.)

Albright, Muriel
Bricker, Mildred
Drexler, Mary Claire
Fisher, Anne Elizabeth
Fletcher, Margaret H.
Hewitt, Dorothy R.
Hipps, Virginia Mae
Horne, Betty LaRue
Johnson, Marjory
Koehler, Ruth
Lescask, Genevieve
McComb, Betty Jane
Mendler, Marie
Page, Dorothy
Ripanti, Norma Eleanor
Tweedy, Cleo Elizabeth
Van Dommelen, Louise J.
Weaver, Paige

*Class from Bouve-Boston School of Physical Education:*

Creighton, Joan E., 103 Gainsborough, Boston 15, Mass.
Geary, Elizabeth, 1 Autumn St., Boston 15, Mass.
Johnson, Emilie M., Hotel Peter Bent, Boston, Mass.
Kalbfleisch, Ivie J., 18 Oakland Road, Brookline, Mass.
Richardson, Virginia, 205 Auburn St., Cambridge, Mass.
Smith, Ellen H., Hotel Peter Bent, Boston, Mass.
Spencer, J. Elizabeth, 103 Gainsborough St., Boston 15, Mass.
Sweeney, Agnes V., 10 Ashmont St., Dorchester, Mass.
Symonds, Mary K., 18 Oakland Road, Brookline, Mass.
Tregale, Florence, Hotel Peter Bent, Boston, Mass.
Warren, Elizabeth M., Framingham, R. F. D. 2, Mass.

## Volunteer Physical Therapy Assistants

A group of eleven volunteer physical therapy assistants, the first class in the United States, was graduated at the December 1943 meeting of the Illinois Chapter in Chicago. This course was sponsored by the American Women's Volunteer Service and was given under the supervision of the American Physiotherapy Association.

## Army Promotions

The Surgeon General of the Army announces the following promotions of Medical Department Physical Therapy Aides to the grade of First Lieutenant:

Anderson, Ruth E., Bruns General Hospital, Santa Fe, New Mexico.
Bullard, Winifred, Station Hospital, Ft. Jay, N. Y.
Carlin, Eleanor, Army Medical Center, Washington, D. C.
Coe, Marion, Oliver General Hospital, Augusta, Ga.
Cox, Faye, Station Hospital, Ft. Francis E. Warren, Wyo.
Coyne, Nadene, Special Training Unit.
Gaither, Ann, Army Medical Center, Washington, D. C.
Harvey, Ruth Jane, Gardiner General Hospital, Chicago, Ill.
Hendricks, Lelia, Overseas.
Ionta, Margaret, Orlando Army Air Base, Orlando, Fla.
Poor, Josephine, Station Hospital, Camp Lee, Va.
Prescott, Leona, Station Hospital, Camp Maxey, Tex.
Richter, June E., Woodrow Wilson General Hospital, Staunton, Va.
Tipton, Dorothy, Station Hospital, Fort Benning, Ga.

* * * * *

The Surgeon General of the Army announces the following promotions of Medical Department Physical Therapy Aides from the grade of First Lieutenant to the grade of Captain:

Snyder, Agnes, Army and Navy General Hospital, Hot Springs, Arkansas.
Theilmann, Ethel, O'Reilly General Hospital, Springfield, Mo.

## A Moroccan Dinner

Lieutenant Helen T. Lawrence writes as follows from her station with the 33rd General Hospital, somewhere in North Africa:

"One day we visited Bizerte, which certainly is a ghost city. Just about every house is bombed —it looks almost as if it were planned that way and it may have been. It must have been a lovely city originally because there still are traces of the gardens and flowers amid the ruins."

Under date of September 7, 1943, she wrote:

"The Sunday before I left, or we left, our first place I was very fortunate to be invited to a real Moroccan dinner or 'defa,' I believe it is called, in a native Moroccan home which was very interesting. First we went up about three flights of stairs to the dining room which didn't look at all like a dining room but rather a living room with long low divans on which we sat. Then a native woman draped in clothes of rose and yellow and blue passed a large brass bowl with a cake of soap and poured water out of a shiny brass pitcher while you washed your hands. You were given a Turkish towel to put across your lap and you really needed it as you eat everything with your fingers.

"Next they brought in some beautifully inlaid wooden tables—low, of course—and placed them in front of us. There were about 20 of us all together and we were gathered around three of these tables. They put linen cloths over the tables and then brought on the first course, which was pigeon pie, and most delicious stuff I have ever eaten. There was one pie on each table. It was made of very rich, tissue-paper-thin pastry in layers with pieces of meat and spices scattered throughout. On top was sprinkled powdered sugar and there was a dish of powdered sugar in the center to dip pieces into as you wished. It is a grave offense to eat with the left hand or touch food with the left hand, and it really was quite a problem to remember it all through the meal. What you do is just reach over, tear off pieces and eat it with your fingers. All their food is very rich and beautifully seasoned with spices of all kinds. Anyway, we ate plenty of that and then they brought in bread, loaves about 8 or 10 inches in diameter, which the host broke into several pieces and passed around. Bread is sacred, and none is ever wasted. Then came roast goose with delicious dressing of rice, raisins, honey and spices. It was served whole, and you reached over and tore it off piece by piece, so you can imagine how tender it had to be and was. If at any time the host broke off a piece and extended it to you, you had to take it or he would be insulted, so we all ate more than we would have because he did this frequently. You also just put your hand in and took a handful of dressing.

"We were served roast chicken with a browned sauce flavored with lemon and after that some roast goat meat—which sounds awful but which was really quite a delectable dish, due to the seasoning, and almonds heaped on top. As you may realize there was a noticeable lack of vegetables. After some of each of these dishes we were certain there could be no more, but sure enough then came some super-scrumptious pastries which were shaped like our very large pretzels. These were very rich pastry baked in honey and sesame seeds. Next was a fruit course of lucious big white grapes, melon and prune plums. The native woman then returned to let us wash our hands, which by that time were much in need of it as you can imagine, and gathered up the very much-used towels. We were asked to go into another very much larger room with high ceiling and higher couches or divans lining the room. On these couches were numerous and varicolored pillows and you just naturally relaxed and enjoyed the misery of a much overloaded stomach, when coffee was served in very delicate china demi-tasse cups with cake. When that had time to settle, the brother of the host made a mint tea which was superb. It was a real ritual and it is the custom that the honored guest prepare it. This was served in tall glasses of colored crystal and with it delicious little cookies of almond paste and almonds. You would have loved the whole thing as I did. The men—the host and his brother and a friend—spoke only French, Spanish and Arabic, so there was another man who acted as interpreter. He told us that the food which we left was taken to the table of the host's wives and children and what was left from there went to the servants, so that none was wasted.

"It certainly was a privilege and opportunity of a lifetime which I shall never forget. It is really a good thing I went, too, because the next few days as we traveled cross country we ate only C-rations, which are beans, hash or stew and hard biscuit for all three meals a day; so I certainly could appreciate the memories of a meal which lasted three hours.

"The train ride across was really fun in spite of difficulties. There were three coaches which were for officers and nurses. These had compartments, and anywhere from 4 to 6 occupied a compartment. The first two cars had red leather upholstered seats, and everyone crowded to get in those. Of course, we were pushed back into the third car which had wooden slat seats and backs. We felt very much abused but decided to make the best of it and next morning were quite satisfied since those in the other cars were all bitten up by bedbugs, and so we realized we were lucky after all. We enjoyed the trip though and saw lots of beautiful country we'd surely never have seen otherwise. I had always pictured North Africa as being very flat and all desert, but such is not the case. There are lots of very high mountains which we came over, through and around.

"When we arrived here we camped in a cow pasture at midnight and slept the rest of the night on the ground, or rather on top of bedding rolls, and, of course, we did have a blanket. The next morning we pitched our pup tents, or rather one tent between two of us, and lived that way for a week until they put up larger tents which are gradually getting to be quite livable with our grass rugs, tables, chests, etc.

"All the officers are wonderful to us here and manage to get things to make living more comfortable for us and take us out for a change. It is good that they do because there is nothing to do otherwise. The town we are near is so badly bombed there is nothing to do or nowhere to go, and no stores, so we certainly can save money.

"It is strange how we appreciate little conveniences that we took so for granted at home, and everyone is learning to eat things they never did before."

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# Index to Current Literature

### Amputations

*Amputation Stumps—The Physiotherapist's Part in Their Preparation for Limb Wearing.* R. D. LANGDALE KELHAM. J. Chart. Soc. M. & M. Gym., Dec. 1943.

*The Care of Patients with Amputations.* MARGARET S. AREY, R.N. Amer. J. Nursing, Jan. 1944.

### Anterior Poliomyelitis

*Management and Care of the Infantile Paralysis Patient.* EDWARD L. COMPERE, M.D. Arch. P. T., Dec. 1943.

*The Modes of Spread of Infantile Paralysis.* Editorial, J.A.M.A., Dec. 4, 1943.

*Tracheotomy in Bulbar Poliomyelitis.* T. C. GALLOWAY, M.D. J.A.M.A., Dec. 25, 1943.

*Poliomyelitis Outbreaks of 1943 Offer Lesson for Future.* DON W. GUDAKUNST, M.D. Hospital Management, Dec. 1943.

### Apparatus

*New Suction and Compression Device for Circulatory Disturbances: A Preliminary Report.* LESTER JANKAY, M.D. Arch. P. T., Dec. 1943.

### Arthritis and Rheumatism

*Suppurative Myositis and Purulent Arthritis Complicating Acute Gonorrhea.* JOHN H. LINNER, M.D. J.A.M.A., Nov. 20, 1943.

*Psychogenic Rheumatism.* CAPT. E. W. BOLAND AND COL. W. P. CORR, M.C., A.U.S. J.A.M.A., Nov. 27, 1943.

*Hope (False) for the Victims of Arthritis.* Current Comment, J.A.M.A., Nov. 27, 1943.

### Bone and Joint Injuries and Diseases

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*Postoperative Post-traumatic Osteoporosis or Sudeck's Atrophy.* JOSEPH BUCHMAN, M.D. Bull. Hospital for Joint Dis., Oct. 1943.

*Semimembranous Bursitis: Association with Tear of the Internal Meniscus of the Knee Joint by Common Trauma.* MICHAEL BURMAN, M.D. J.A.M.A., Jan. 1, 1944.

### Dermatology

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*Treatment of Lupus Vulgaris.* F. GLYN-HUGHES. Brit. Med. J., Oct. 16, 1943.

*Fixed Eruption, Conjunctivitis and Fever from Sulfathiazole.* LT. COMM. WM. DIRECTOR. Arch. Derm. and Syphil., Nov. 1943.

*Hyperhidrosis of the Feet.* Arch. Derm. and Syphil., Nov. 1943.

*The Action of Ultraviolet Rays in Dermatologic Practice.* RALPH BERNSTEIN, M.D. Hahnemannian Monthly, Nov. 1943.

*Outline of Recent Developments in the Recognition and Prevention of Allergic Contact Dermatitis in Industry.* DAVID HARLEY, M.D. Brit. J. Phys. Med. and Indus. Hygiene, Nov.-Dec. 1943.

### Electrotherapy

*Electric Shock Therapy: Its Indications and Use.* JOSEPH G. RUSHTON, M.D., AND JOHN A. AITA, M.D. Arch. P. T., Dec. 1943.

*Oxygen in Electro-Shock Therapy.* ANNE HOLOVACHKA, M.D. J. Nerv. and Mental Disease, Nov. 1943.

### Exercise

*Conservation of Health by Exercise.* JOHN C. ELKINS. Hospital Corps Quarterly, Oct. 1943.

### Eye, Ear, Nose and Throat

*Industrial and Domestic Injuries of the Eye.* C. P. CLARK, M.D. J.A.M.A., Jan. 15, 1944.

*Infra-Red Therapy of Flash Keratoconjunctivitis.* DAVID G. COGAN, M.D.; V. E. KENSEY, Ph.D., AND PHILIP DRINKER, Ch.E. J.A.M.A., Dec. 4, 1943.

*A Survey of 2,000 Industrial Eye Injuries.* EDWARD COLLIER. Brit. J. Phys. Med. and Indus. Hygiene, Nov.-Dec. 1943.

### Foot Conditions

*Physical Treatment of Disabilities of the Foot Commonly Encountered in Military Service.* CAPT. THOMAS E. DREDGE (MC) A.U.S. Arch. P. T., Nov. 1943.

### Fractures

*Concerning Ununited Fractures of the Carpal Scaphoid.* JAMES K. STACK AND PAUL B. MAGNUSON. Quarterly Bull., Northwestern Univ. Med. School, Winter Quarter, 1943.

### Heat and Cold

*The Treatment of Shock with Special Reference to the Use of Heat and Cold.* WARREN H. COLE, M.D. Arch. P. T., Nov. 1943.

*Refrigeration Anesthesia of the Extremities.* S. THOMAS GLASSER, M.D., AND WALTER L. MERSHEIMER, M.D. Amer. J. Surg., Nov. 1943.

### Hydrotherapy

*American Health Resorts: The Administration, Supervision and Control of Health Resorts.* CYRUS B. ELMORE, M.Sc., AND WALTER S. MCCLELLAN, M.D. J.A.M.A., Dec. 4, 1943.

*American Health Resorts: Importance of Trace Elements in Biologic Activity.* OSKAR BAUDISCH, Ph.D. J.A.M.A., Dec. 11, 1943.

*American Health Resorts: The Historical Background of Resort Therapy.* HOWARD W. HAGGARD, M.D. J.A.M.A., Dec. 18, 1943.

*American Health Resorts: Economic Aspects of Health Resort Therapy.* A. M. SIMONS, M.D. J.A.M.A., Jan. 1, 1944.

### Hyperpyrexia

*Fever Therapy in Ophthalmology.* FREDERICK C. CORDES, M.D. J.A.M.A., Jan. 1, 1944.

*Ocular Complications of Fever Therapy.* EDWARD P. BURCH, MAJOR, AND ABRAHAM J. GEWIRTZ, CAPT., M.C., A.U.S. Digest of Ophthalmology and Otolaryngology, Jan. 1944.

*Complications of Combined Sulfathiazole-Fever Therapy.* ARTHUR M. PRUCE, CAPT., M.C., AND BENJAMIN B. LENNON, MAJOR, M.C. Arch. P. T., Dec. 1943.

### Injuries

*The Use of Compression as a Surgical Principle in the Treatment of Injuries.* SUMNER L. KOCH. Quarterly Bull., Northwestern Univ. Med. School, Winter Quarter, 1943.

*Care of Facial Injuries.* GORDON B. NEW, M.D. Digest of Ophthalmology and Otolaryngology, Jan. 1944.

*Wound Phthisis.* A. V. ROSAKOV. Amer. Review of Soviet Med., Dec. 1943.

### Nervous and Mental Diseases and Injuries

*Psychiatric Problems in the Army.* LT.-COL. WM. C. MENNINGER. J.A.M.A., Nov. 20, 1943.

*Emotional Disturbances of Children in Wartime.* HENRY F. HELMHOLZ, M.D. Minn. Med., Dec. 1944.

*Some Thoughts About Shock Therapy.* CLARENCE A. NEYMANN, M.D. Arch. P. T., Nov. 1943.

*The Treatment of Shock with Special Reference to the Use of Heat and Cold.* WARREN H. COLE, M.D. Arch. P. T., Nov. 1943.

*Electric Shock Therapy: Its Indications and Use.* JOSEPH G. RUSHTON, M.D., AND JOHN A. AITA, M.D. Arch. P. T., Dec. 1943.

### Peripheral Nerve Injuries

*The Time Element in Restorative Surgery of Peripheral Nerve Lesions.* VLADIMIR V. LEBEDENKO. Amer. Review of Soviet Med., Oct. 1943.

*Physical Therapy in Peripheral Nerve Injuries.* RICHARD KOVACS, M.D. Arch. P. T., Dec. 1943.

### Physiology

*The Effect of Exercise on Chloride Excretion in Man During Water Diuresis and During Tea Diuresis.* M. GRACE EGGLETON. J. Physiology, Sept. 30, 1943.

*Physiology of the Spinal Cord.* OLAN R. HYNDMAN, M.D. J. Nerv. and Mental Dis., Oct. 1943.

### Rehabilitation

*Medical Rehabilitation in the Veterans Administration.* C. F. BAYER, M.D. Arch. P. T., Dec. 1943.

*Rehabilitation in Cases of Arthrogryposis Multiplex Congenita.* CARL E. BADGLEY, M.D. Arch. P. T., Dec. 1943.

*Rehabilitation.* HARRY E. MOCK, M.D. Arch. P. T., Nov. 1943.

*The Summary of the Round Table of Rehabilitation, American Psychiatric Association.* Occup. Therapy and Rehab., Oct. 1943.

*Wheel Chair War Job.* The Spastic Review, Dec. 1943.

### Short Wave Diathermy

*Diathermy in Eye Disease.* From Letters, Brit. Med. J., Oct. 16, 1943.

*Use of Diathermy in Submucous Resection.* ARTHUR C. JONES, M.D. Arch. Otolaryngology, Nov. 1943.

### Ultraviolet Radiation

*The Nature and Chemical Action of Ultraviolet Light.* G. K. ROLLEFSON. Arch. P. T., Nov. 1943.

*The Action of Ultraviolet Rays in Dermatologic Practice.* RALPH BERNSTEIN, M.D. Hahnemannian Monthly, Nov. 1943.

*Causalgic States Following Injuries to the Extremities.* GEZA DE TAKATS, M.D. Arch. P. T., Nov. 1943.

# ABSTRACTS

John S. Coulter, M.D.

## Rate of Regeneration of Peripheral Nerves in Man

H. J. Seddon, P. B. Medawar and H. Smith. In JOURNAL OF PHYSIOLOGY, 102:2:214, September 30, 1943.

The rate of regeneration of peripheral nerves in man has been so universally accepted as about 1 mm. a day that the basis for and accuracy of this estimate have long remained unchallenged. There is no doubt that the rate is something of this order as compared with figures such as 0-1 or 10 mm. a day. But the subject is a complex one. There may be different rates for fibers of different types, and it is probable, even likely, that the various methods of estimation at our disposal will give results that are not even comparable. Is it true that regeneration progresses at a uniform rate throughout the length of a nerve?

The paper describes observations on the rates of recovery of sensory and motor functions in man after peripheral nerve lesions of different types.

After the interruption of a nerve, the muscles normally supplied by the part that lies peripheral to the lesion return to functioning in the anatomical order of their nerve supply. An estimate of the rate of motor recovery may be obtained by recording the times at which the muscles show their first signs of voluntary contraction, and by making use of specially collected anatomical data showing the distances at which they lie from the level of the interruption.

The rate of sensory recovery may be calculated by measuring the advance of pain and touch sense in a long zone of cutaneous insensibility.

The rate of advance of Tinel's sign, though of limited functional significance, has some prognostic value and provides an additional method for the study of sensory recovery.

The rate of recovery falls off progressively as the process moves towards completion. It can however be regarded as constant over the moderate ranges of time and distance over which the process was recorded in the great majority of the cases described. The following average estimates have been obtained for the rate of motor recovery. In the radial nerve: after suture 1-6 $\pm$ 0.2 mm. day; after axonotmesis 1.5 $\pm$ 0.1 mm. day. In all nerves studied: after suture 1.5 $\pm$ 0.2 mm. day; after axonotmesis 1.4 $\pm$ 0.1 mm. day. The average rate of advance of Tinel's sign after suture has been found to be 1.7 mm. day.

The principal variables that affect clinical estimates of the rate of recovery are, after suture: the interval between injury and repair of the nerve, the state of the stumps at the suture line, and the amount of damage inflicted by postoperative stretching in cases where extensive resection before suture had proved to be necessary. After axonotmesis: the extent of the damage to supporting structures within the trunk of the nerve.

When estimates have been corrected for the greater range of times and distances over which recovery in human cases can be recorded, the rates of recovery in man are not found to be greatly different from those estimated by more precise methods in the rabbit.

Studies of the rate of recovery in man are of value for the prognosis of nerve injuries and for judging the efficiency of the various types of operation used for their repair.

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## The Treatment of Shock with Special Reference to the Use of Heat and Cold

Warren H. Cole, M.D., Chicago. In ARCHIVES OF PHYSICAL THERAPY, 24:11:675, November 1943.

*Comment*

The experiments referred to do not indicate that patients in shock should be subjected to refrigeration. They simply indicate that administration of heat may be definitely harmful. In other words, the thermal therapy of a patient in shock should not be active in either direction, i.e., heat or cold. Ordinarily, thermal therapy may be ignored, since room temperature, with perhaps the application of a single blanket as utilized in the postoperative wards of a hospital, will be the most favorable circumstances from the standpoint of heat or cold. The patient's temperature, par-

ticularly in the extremities, may drop several degrees. This appears to be a protective reaction on the part of the body, and exposure of the patient to room temperature will not elevate the temperature significantly until the patient is out of shock.

The most significant deleterious effect from heat is derived from the increase in the metabolic rate and consequent increased oxygen consumption. Since the body already is in a state of anoxia, this increase in the metabolic rate and oxygen consumption becomes harmful. A second reason why heat is deleterious is that it produces vasodilatation, replacing the vasoconstriction which is a protective mechanism improving the blood pressure and consequently the blood flow. The vasodilatation results in reduction of the circulating blood volume, thereby counteracting the efforts of the body to combat the loss in the blood volume. The work of Gibbon and Landis and others offers proof of this reasoning. A third deleterious effect from heat therapy is related to the increase in loss of fluid by perspiration, and into the tissues through increased capillary permeability. The work of Landis suggests that the vasodilatation increases the capillary pressure, thereby resulting in an increased transudation of plasma through the capillary wall.

It is impossible to put too much emphasis on the necessity of treating shock immediately. There is almost as much urgency in the treatment of shock as in the treatment of slow persistent hemorrhage, largely because the two conditions are very similar. The justification of such a statement lies in the fact that the condition of shock reaches an irreversible state in a few hours, after which the deleterious effects cannot be remedied even by treatment of the most expert type, and death ensues. As a matter of fact, the speed of recovery from shock is related directly to the duration of shock. One of the explanations for the relatively low mortality rates in the military casualties of this war, at least in the Allied armies, lies in the fact that shock is now treated by means of plasma transfusions, etc., as a first aid procedure on the battlefield, long before definite therapy can be executed.

## Actinotherapy in Children

Eva Morton, M.R.C.S. Eng., L.R.C.P. Lond. In BRITISH JOURNAL OF CHILDREN'S DISEASES, 40:475-477:69, July-September 1943.

Although it is long since there could have been any real question as to the value of actinotherapy in the treatment of various forms of disease and ill-health, it is probable that too many physicians still believe its main, if not its only, indication to be rickets in young children. It might, therefore, be of interest to indicate briefly the types of case which have been found to benefit most from this form of therapy, based on an experience extending now well over 15 years.

Where local therapy is called for, as in alopecia, adenitis, etc., it has almost always been found best to combine this with general light baths, as giving quicker and more lasting results. The initial dosage is always small.

Rickets and debility are the two commonest reasons for referring infants and young children to the Light Department.

Malnutrition is a third somewhat large group among the younger patients, catarrh coming next in order, though a good deal further down. Among 184 new cases treated at one of the Hackney Centres during 1942, 63 were referred for rickets, 58 for debility, 47 for malnutrition, 10 far catarrh, and one each for adenitis, alopecia, "backwardness," chilblains, skin trouble, and sleeplessness.

## The Effect of Frostbite on the Sympathetic Nervous System

By Nikolain Burdenko. In the AMERICAN REVIEW OF SOVIET MEDICINE, 1:1:22, October 1943.

The effect of low temperatures on the human body has recently been given particular attention in the U.S.S.R. Professor S. S. Girgolav's report to the Twenty-Fourth All-Union Congress of Surgeons that 2 per cent of the total number of hospitalized patients were found to be suffering from frostbite makes it obvious that we must know how to treat patients suffering from the effects of low temperatures. Although much research has been done on the morphology, pathology, and pathogenesis of frostbite, as well as on its therapy, there are, however, some aspects of frostbite which have not received sufficient attention—certain reflexes, the understanding of which would permit us to adopt corresponding measures.

*Conclusions:* In the present article I have discussed one of the components of a complex reaction of the organism to low temperature. By analyzing the pathogenesis, we have arrived at a logical conclusion on the advisability of physiologically blocking the reflex arc at the beginning of the injurious influence of low temperature. Such blocking facilitates the therapeutic measures recommended in frostbite. These measures serve to reestablish circulation and protect the chilled parts from infection. Infection itself is the result of damaged circulation and therefore the measures undertaken to restore circulation are of primary importance.

### Localized Neuritis of the Shoulder Girdle

J. D. Spillane, M.D., Wales, M.R.C.P. In LANCET, 18:2:534, October 30, 1943.

The commonest form of neuritis in the MEF is without doubt diphtheritic polyneuritis. The high incidence of this complication with the long disabilty resulting has received much comment. Acute febrile polyneuritis is rare while polyneuritis following dysentery, malaria and enteric fever has been infrequent. Fibrositis is common but the ordinary clinical forms of interstitial neuritis are not often seen in general hospitals.

*Prognosis and Treatment*

I have been impressed by the failure to improve in those cases developing obvious atrophy. Mild cases were returned to duty or down-graded while those with a pronounced disability were evacuated. The usual forms of treatment for neuritis in general did not seem to alter the course of the illness. Analgesics, physical therapy and relaxation of paralyzed muscles were prescribed. Relaxation of the serratus magnus is difficult to secure. Several patients showed no improvement after 7 or 8 months. Permanent paralysis of the serratus magnus is such a troublesome disability that the question of transplanting the sternocostal portion of pectoralis major from the humerus to the inferior angle of the scapula, as originally suggested by Sherren, might well have to be considered.

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### Oral and Rectal Temperature After Exercise

Current Comment. In the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 123:2:96, September 11, 1943.

Temperatures taken by rectum are about 1 degree F. higher than those taken by mouth. The body temperature rises several degrees as a result of exercise, the extent of rise being dependent on the amount, intensity and nature of the exertion. Recently Brennemann reported the recording of the rectal and oral temperatures just before and just after various degrees of exercise in 10 children and 3 adults, all apparently in sound health. The rectal temperatures rose from 1 to 4 degrees F. higher after exercise while oral temperatures remained relatively unchanged, rose only slightly or even dropped. The increase in rectal temperatures and hence the variation from the oral was directly proportional to the intensity of the exercise. Normal temperatures both by rectum and by mouth were resumed in from thirty to sixty minutes. The clinical implications are obvious; a high afternoon or postexercise rectal temperature in a child cannot be presumed to reflect a disease process and conversely the danger of such a high temperature masking a disease process should not be overlooked.

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### Regeneration of Nerve

In LANCET, 20:2:611, November 13, 1943.

Knowledge of the rate of nerve regeneration is useful for determining the time at which recovery may be expected after nerve suture, and still more important in cases where nerves have been injured but not sutured. Absence of exact information about the time at which spontaneous recovery may be expected probably leads to undue delay before exploratory operation in many of these cases. The rate which is required is of course not that of the advance of the tips of the new fibers. Thin nerve-fibers may reach a muscle long before it shows recovery. Before the new stretch of nerve can function the nerve-fibers must thicken and medullate. By studying the time at which function returns in muscles at various distances from the lesion we can therefore estimate the rate of advance of what may be called functional completion along the nerve.

Gutmann and others found that regeneration to the level of functional completion may proceed down the short nerves of rabbits as fast as 3-5 mm. a day. Until more is known of the course of decline in the rate of recovery average values can be used for comparing the results after different types of lesion. The rate per day in the radial nerve after suture was found to be 1-6 mm. as the average of 6 cases, with variations between 1-0 and 2-4 mm. In 10 cases of "spontaneous" recovery (axonotmesis) the average rate was 1-5 and the limits 0-7 and 2-1 mm. per day. The rate of recovery in 14 cases of suture of radial nerve described by Stopford can be calculated in the same way, and proves to be only 0-6 with extremes of 0-4 and 0-7 mm. per day. The reason for the strikingly faster rate in the recent cases remains obscure. The possibility of making such comparisons shows the value of the method. It is to be hoped that with the careful following of cases now being undertaken at the various nerve injury centers still more exact estimates and further information about the variables which affect the rate of nervous regeneration will be obtained. This should help considerably in the diagnosis, prognosis and management of these cases in which the long delay before recovery is such a difficult feature.

### The Administration, Supervision and Control of Health Resorts

Cyrus B. Elmore, B.E., M.Sc., and Walter S. McClellan, M. D., Superintendent and Medical Director, Respectively, the Saratoga Spa, Saratoga Springs, N. Y. In J.A.M.A., 123:14:898, December 4, 1943.

The authors considered this subject under four headings: (1) Ownership; (2) Administration; (3) Operation, and (4) Opportunities and Responsibilities. They state that opportunities and responsibilities which will come to every health resort include:

The opportunity for the development of natural therapeutic resources with the responsibility that it be accomplished along scientifically controlled lines.

The opportunity for the alleviation of chronic ailments, with the responsibility for frank accrediting to all factors involved.

The opportunity for the direct care of patients with the responsibility for strict observance of medical and business ethics.

The opportunity to advance public knowledge of the benefits of spa therapy with the responsibility for avoiding any savor of "showmanship."

### Shortening of Disability in Fractures of the Olecranon by Fixation with Longitudinal Stainless Steel Screws and Immediate Active and Passive Motion

Paul H. Harmon, M.D. In GUTHRIE CLINIC BULLETIN, 13:2:58, October 1943.

A case report is presented, illustrating the simple technic, accurate fixation and accelerated convalescence from a simple transverse fracture of the olecranon which was treated by the principle of longitudinal screw fixation.

While this is not a new technic, it is one not in favor with most authorities who have written textbooks on the management of fractures in recent years.

It deserves wider recognition and universal application because it allows the application of the modern concept of anatomic reduction and free motion of the joints during osseous healing to be observed.

### Recent Advances in Treatment: Surgery

W. Gemmill, Ch.M., F.R.C.S. In PRACTITIONER, 151:904:4:197, October 1943.

Since the beginning of the war a reform in the treatment of industrial accidents, much needed and too long delayed, has begun to receive the attention which it deserves.

It has long been recognized in industrial centers that there is a grave wastage of manpower through accidents, often of a minor degree. The small metal splinter in the finger, or the tiny septic wound, if not dealt with adequately in hospital in the early stages, frequently results in a long illness, grave permanent disability and sometimes even the death of the patient. The patient with a fractured limb who attends hospital as an out-patient once or twice a week for massage, and spends the rest of the week resting the limb at home, runs a great risk of becoming a permanent cripple. The conclusion is evident. All these patients must be under continuous observation and treatment from the time of the accident until the return to work.

The Ministry of Health, recognizing the importance of such treatment to the war effort, has taken steps to introduce rehabilitative methods into the Emergency Medical Services. The British Orthopaedic Association has urged that centers for the later stages of rehabilitation should be set up throughout the country, closely associated with hospitals, but separated from them geographically so as to avoid the hospital atmosphere.

### Apparatus for Buerger's Exercises

Ira M. Gambill, M.D., and Alan Kanehsine, Chief Technician, Physical Therapy, Vet. Adm., Mountain Home, Tenn. In MEDICAL BULLETIN OF THE VETERANS' ADMINISTRATION, 20:2:174, October 1943.

An apparatus which was constructed at the Veterans' Administration Facility, Mountain Home, Tenn., to administer Buerger's exercises in the treatment of peripheral vascular conditions of the lower extremities, has given particularly satisfactory service. In use for 8 months up to July 1, 1943, it has proved superior to other means of administering those exercises. This includes the modified Buerger-Allen technic.

Buerger's exercises have earned a definite place in the treatment of peripheral vascular conditions.

The apparatus for such exercises described in the foregoing simplifies the administration of a standard and approved technic.

This apparatus has all the advantages and none of the disadvantages of Buerger's exercises as routinely given.

It replaces expensive motor-driven apparatus.

It is simple to construct, easy to use, and has no gadgets to get out of order.

The cost of apparatus is negligible, as all of its parts are standard or can easily be made in a field station shop. Our apparatus was constructed entirely of material found in the physical therapy clinic or elsewhere on the station.

## Causalgic States Following Injuries to the Extremities

Geza de Takats, M.D., Chicago. In ARCHIVES OF PHYSICAL THERAPY, 24:11:651, November 1943.

Physical therapy is frequently called on to treat the sequelae of injuries, such as atrophic muscles, stiff joints, shortened tendons and thrombosed or constricted blood vessels. The usual methods of heat, massage and exercise all improve circulation to the injured extremity, increase function and relieve pain. There exists, however, a group of cases in which the usual forms of physical therapy aggravate pain and increase disability. It is the purpose of this paper to describe this group of cases, the knowledge of which would seem essential to specialists in physical therapy.

Such cases, especially the mild, abortive forms, are far more frequent than any of us would have supposed. In recent studies, Miller and I reported on 36 patients, and their number is steadily growing, since one's attention is more closely focused on them. A variety of names have been employed to designate the same syndrome, such as traumatic edema, acute bone atrophy, Sudeck's atrophy, post-traumatic osteoporosis, peripheral trophoneurosis, minor causalgia and reflex dystrophy. Reflex dystrophy, or post-traumatic dystrophy, has been the term used by us, although we do not feel that this label is any better than the rest of them. Since the word "causalgia" became popular in World War I, and since the syndrome is again appearing in some of the military hospitals, "causalgic state" seems to be a useful term for the syndrome under discussion.

The causalgic state begins very early, a few hours or days after an injury. The injury is usually mild, and occurs around the wrist, ankle or small joints of the hand or foot, where masses of muscle are absent and where nerves are abundant and superficial.

Severe, persistent pain of a burning character with paroxysmal aggravations is presented by the patient, whose injured limb is properly immobilized, noninfected and seemingly on the way to normal repair.

In a second state the extremity is not as warm and flushed, but may become hard, cyanotic and cold to the touch. Strips of warm dry skin, corresponding surprisingly well with sensory distribution, are surrounded by a marginal hyperhydrosis. Because of the splinting action of the muscles and because of the synovial edema, the joints become stiff. The pain has now spread proximally toward the root of the limb and is aggravated by extremes of temperature, by sudden motions or by jarring. A spotty bone atrophy becomes evident.

Finally the skin becomes atrophic, the joints are stiff, the muscles are atrophic and a diffuse osteoporosis appears in the films.

It is significant that in typical cases causalgia can be aggravated by prostigmine or mecholyl, which stimulate cholinergic fibers. In fact, we have used prostigmine as an early diagnostic test for causalgic states. When 1 cc. of 1:2,000 prostigmine solution is administered subcutaneously to a patient suffering from causalgia, the limb becomes warmer, the oscillations become much more pronounced and the pain is increased. In the control limb, the oscillogram may also show some increase in pulsations but not to the same extent; nor is there any pain from this or repeated doses.

The pain of causalgia can be abolished by any method which will lower the increased capillary pressure, and which will abolish the capillary barrage.

We have combined the block of the sympathetic ganglions with active motion, preferably under water. The temperature of the water should be around 70 F., which the patients seem to tolerate better than extremes of temperature. A few of our patients have constructed whirlpool baths in their homes and derived great relief from their use.

*Summary*

Attention has been called to a vasodilator mechanism which exists as a result of the stimulation of posterior root efferent fibers. This system may become irritated after comparatively mild injuries around the smaller, less protected joints and after frostbites, burns or low grade chronic infections. The usual methods of physical therapy, such as the use of heat, massage and passive exercises, invariably aggravate the syndrome. Initial rest, relief of pain by nerve block and cautious cool baths followed later by more vigorous physical therapy under the protection of nerve block are recommended for treatment. In the late stages the condition is intractable, and even root section or cordotomy may not help it.

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## Some Thoughts About Shock Therapy

Clarence A. Neymann, M.D., Chicago. In ARCHIVES OF PHYSICAL THERAPY, 24:11:663, November 1943.

The medical profession usually evaluates a new therapeutic procedure by stages. In the beginning, very little attention is paid to a new scien-

tific discovery. Then if the first clinical reports are confirmed by many investigators a period of overenthusiasm ensues. After this we are suddenly seized by disappointment because the new therapy has not lived up to our most roseate expectations; everybody seems to enjoy voicing their complete disgust in the apparent failure of the medication because it has not performed the miracles foolishly ascribed to it. Finally, after years of dispute and argument, the true worth of the remedy is established.

From all this it follows that electric shock therapy should be used only by a skilled psychiatrist who has learned enough about electrical currents to appreciate their clinical significance. In order to produce a convulsion a current of approximately 600 milliamperes and 120 volts is passed through the frontal region during a time interval from 0.3 to 1.5 seconds. Such a current may cause death if it is passed directly through the region of the heart or the respiratory center. Electric shock therapy is far from being an indifferent procedure.

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### Physical Medicine: Its Scope and Duties

Lord Horder's Survey. In LANCET, 18:2:551, October 30, 1943.

We are about to face, in grim earnest, the problems that have to do with reconditioning and refitting physically, mentally and spiritually, the men, women and children of the nation, injured in all these aspects by a life and death struggle against a sporadic outburst of barbarism. In the general scheme by which this task may be accomplished medicine has a very great part to play and a great deal of its contribution will inevitably lie along the road of physical medicine.

A description of physical medicine recently propounded by Brigadier Howitt makes an appeal to me. He gives it three functions: (1) the achievement and maintenance of physical fitness; (2) the diagnosis and treatment, preventive and curative, by physical means, of disease and disability of the locomotor system; and (3) the physical selection, training and reinstatement of personnel in industry and in the armed forces.

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### March Fracture of the Metatarsal Bones

H. H. Fouracre Barns, M.B., B.S., F.R.C.S., M.R.C.O.G. In BRITISH MEDICAL JOURNAL, 609, November 13, 1943.

March fracture, or spontaneous stress fracture, is most often seen in the metatarsal bones, but has been observed in others, including the femur (Peterson, 1942). This type of fracture was well recognized before and during the war of 1914-18. A number of articles have been published recording cases that have appeared during the present conflict.

The treatment in the present series has consisted of a below-knee plaster, with a walking-heel attached, for approximately four weeks. The toes have been left free on the dorsal aspect and the ankle has been immobilized at a right-angle. Following this the patient has had two weeks' light duty, avoiding all vigorous exercise. At the end of the six weeks he has resumed full duty with the exception of excessive exercise and long marching. No residual disability has been encountered.

Twenty cases of march fracture of the metatarsal bone in recruits are recorded and analyzed.

The clinical findings are described and the x-ray appearances discussed.

It is suggested that the exciting force responsible for the fracture is supplied by the repeated muscular action of the plantar flexors of the toes and foot during the springy movement of walking.

Suggestions for the reduction of the incidence of this type of fracture are offered.

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### Rehabilitation

HARRY E. MOCK, M.D., Chicago. In ARCHIVES OF PHYSICAL THERAPY, 24:11:677, November 1943.

Both the psychology of a sick nation crippled by a long depression and crippled again by a gruesome war and the psychology of the individual crippled by war wounds or by civilian wounds must be altered. Both nation and individual must cease to think of security from want in terms of dependency, whether on the family, the community or the state. Both must return to the psychology of our pioneer forefathers, who stressed the freedom of the nation and individual freedom and demonstrated such freedom by pride in individual enterprise and accomplishment.

A revival of the pioneer spirit which expressed itself in such homely aphorisms as "sink or swim," "paddle your own canoe" and "honesty is the best policy" is essential if rehabilitation of the nation and of the individual is to be accomplished.

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### The Intensive Treatment of Gonorrhea and Syphilis

Herman N. Bundesen, M. D., Theodore J. Bauer, M. D., and H. Worley Kendell, M. D. In J.A.M.A., 123:13:816, November 27, 1943.

The Chicago Intensive Treatment Center is

operated under grants received from the Federal Works Agency, the U. S. Public Health Service, the state of Illinois and the Chicago City Council.

A total of 1,786 patients were admitted to the center for treatment of gonorrhea from Nov. 10, 1942, through Oct. 8, 1943. A detailed report of the results and the technic employed will be published when statistics are available.

## Physical Treatment of Disabilities of the Foot Commonly Encountered in Military Service

Captain Thomas E. Dredge, M.C., U. S. A. In ARCHIVES OF PHYSICAL THERAPY, 24:11:659, November 1943.

Disabilities of the foot occupy a considerable part of every medical officer's time. The types of disabilities of the foot encountered in the Army will vary somewhat from those encountered in civilian practice, owing largely to two factors: (1) the limited age group and (2) the elimination by the draft boards of a large number of men with severe conditions of the foot, including marked congenital abnormalities. However, in spite of selection a considerable number of men suffering from disabling conditions of the feet have been inadvertently inducted into service. Then too there is a group of conditions which are peculiar to the military service, such as trench foot, frostbite, march foot and immersion foot. There is also an increase of trichophytosis of the feet. Because the subject is a broad one, trichophytosis will be mentioned but not discussed.

Sprains are common. They are usually produced by a twist or during jumping or falling, as after a parachute jump. The immediate treatment consists in the reduction of active and passive congestion by the application of a firm support, cold and elevation of the foot. Cold applications are indicated up to forty-eight hours after the injury has been sustained, as local vasoconstriction is desired to lessen extravasation into the tissue about the site of the injury.

Good results have been reported with diathermy. Heat and massage are useful in cases in which there have been effusion and much swelling. Prolonged physical therapy following sprains is usually not necessary if early weight bearing is made possible by proper fixation.

### *Fractures*

Properly applied physical therapy will considerably shorten the period of disability. Briefly stated, the purpose is (1) to promote early absorption of hemorrhage and traumatic exudate, (2) to relax muscle spasm in order to relieve pain and discomforts, (3) to reestablish normal circulatory conditions in the affected extremity, blood stream and lymphatics, which insures a more rapid and complete healing of the fracture, and (4) to build up in the muscle of the extremity the tone and flexibility so necessary to normal use. To this end four basic forms of physical therapy may be used. They are heat, massage, exercise and muscle stimulation.

### *March Foot*

The treatment consists of rest, hot applications and relief from weight bearing. This may restore the foot to normal in a week or ten days. Toe exercises to restore flexibility of the anterior metatarsal arch and a proper arch support or strapping of the foot should be employed when walking is resumed. The average disability is from four to eight weeks.

### *Treatment of Conditions of the Foot*

Manipulation of rigid feet may be done with discretion. This is followed by skillful massage and active and passive movements until the injury has resolved. When necessary, reeducation in muscular control must be given to correct any postural deformity or other error in function in order to prevent recurrence of the strain.

Operative procedures may be employed on hallux valgus, hallux rigidus and sometimes pes cavus. The results may be satisfactory for civilian pursuits but are not sufficient for military activities, especially with hallux rigidus and pes cavus.

### *Immersion Foot*

The picture is that of extreme vasodilatation with damage to the vascular walls and transudation. Intense parasthesias develop eight to ten days after rescue and may last three or four weeks. Rapid warming of tissues is dangerous, as in frostbite. Treatment for immersion foot is as follows: The feet are swabbed carefully with alcohol, and ice bags are applied around them. The feet are elevated 10 to 12 inches (25 to 30 cm.). The object of this principle of treatment is to reduce the tendency toward edema and extravasation of blood until the vasomotor tone can be reestablished.

### *Summary*

Some of the more common disabilities of the foot and their physical treatment have been discussed. A great deal more could be said regarding these conditions, which the military surgeon will encounter in varying numbers, according to the situation. It is a common remark that "the army travels on its stomach." It is equally true that it travels on its feet, and a large part of its success will depend on proper care of the feet.

## Wartime Physical Rehabilitation (II)

In the PROCEEDINGS OF THE STAFF MEETINGS OF THE MAYO CLINIC, 18:19:352, September 22, 1943.

*Conclusion*

The subject of the physical rehabilitation of those disabled by the war is primarily a medical one.

It has many ramifications and the educational aspects must not be overlooked by the physician.

For many years to come, problems of rehabilitation will remain of great importance in our national economy. It is imperative that all physicians interest themselves, at once, in the place which their particular specialty will have in this tremendous physical rehabilitation undertaking.

It seems apparent that the field of physical medicine should be destined to play an important role in the reconstruction program.

If medicine is to assume its rightful place of leadership in this rapidly developing project, we must not permit our preoccupation with the scientific aspects of our narrow special fields of medical endeavor to prevent us from realizing the extreme importance of intelligent medical guidance in the broader socio-economic problems of rehabilitation.

Physicians, because they always have schooled themselves to await proof of the value of a method before accepting it, sometimes are just as slow to become interested in new medical economic problems as they are to adopt new scientific procedure.

But we must not thus delay our immediate consideration of the enormous rehabilitation task which looms before the nation. We must begin at once to think about the contributions which our own particular medical specialties can make toward the solution of this impending vast national problem.

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## Hypothermia in Experimental Infections

Editorials. In J.A.M.A., 123:14:904, December 4, 1943.

Prolonged artificial reduction of body temperature to levels 10 to 15 degrees below normal was suggested as a method of treatment for incurable cancer. This suggestion renewed clinical interest in the physiological effects of hypothermia, particularly in its effects on antimicrobic resistance. Hardy and his colleagues of Cornell University Medical College have therefore tried to produce hypothermia in laboratory animals of the same severity and duration as that suggested in cancer therapy.

By giving rabbits a massive intraperitoneal dose of sodium pentobarbital and then placing them in a special refrigerator the rectal temperature could be lowered to 88 to 91 F. for as long as ninety-six hours without lethal effects. Guinea pigs would tolerate the same degree of hypothermia for periods as long as twenty-four hours. Two twenty-four hour periods of hypothermia per week were well borne by these animals.

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## Nerve and Tendon Injuries

By Sumner L. Koch, M.D., F.A.C.S., Chicago, Illinois. In the BULLETIN OF THE AMERICAN COLLEGE OF SURGEONS, 28:2:126, June 1943.

*Postoperative Care*

"Inflamed and injured tissues need rest."

Mason and Allen's excellent experimental study has demonstrated clearly the process of repair in sutured tendons. The first step is exudation, round cell infiltration, and soft callus formation, not unlike the early process of healing after fracture of bones. By the end of 5 or 6 days, the tendon ends are converted into a soft callus almost gelatinous in consistency. Any tension at this stage simply causes sutures to cut through tendon ends and pull them apart. From the sixth to the sixteen or eighteenth day, fibrous tissue resembling true tendon tissue gradually forms to replace the soft tendon callus. Movement during this period provokes excess of fibrous tissue formation and tends to produce the very adhesions to the surrounding tissues that the surgeon wishes to avoid. Both experimental and clinical evidence indicate that the most favorable results will be secured if the part is kept immobilized for 18 to 21 days in such a position that the affected muscles are relaxed as completely as possible. At the end of that period slight active movement is encouraged but with maintenance of the position of relaxation for another week. At the end of 4 weeks active use is begun, but with care to protect the affected tendons from undue or sudden tension for another 3 weeks' period.

The same general plan of postoperative care can well be applied if only nerves have been repaired, but this important added consideration must be emphasized: After sutured nerves are soundly healed, the muscles supplied by the nerves in question must be kept supported and relaxed until regenerating nerve axons can make their way into the affected muscles. If paralyzed muscles are left unsupported and unprotected from the constant pull of powerful antagonists, they become hopelessly overstretched and the eventual return of function becomes an impossibility, no matter how carefully and accurately the nerves which supply them have been united.

### Chair for Cripples

In the ARCHIVES OF PHYSICAL THERAPY, 24:7:-406, July 1943.

The illustration shows a chair designed by F. B. Veirs, Jr., of Oakland, California, for the use of his daughter, who had an ankylosed hip. The alterations in the chair, an ordinary straight wooden one, made it possible for the patient to get the benefit of the chair back. It is a simple, ingenious device which can be adapted to give comfort to other cripples.

The patient sits on half the seat and takes a comfortable position, so that the amount to be cut from the upper end of the chair leg can be determined. The inclined piece is fastened to the chair with a hinge of the proper size, and a countersunk hole is drilled through the seat into the leg to take a 3-inch screw. The screw is then puttied over and painted.

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### Peripheral Nerve Injuries Determined by the Electrical Skin Resistance Method

By Curt P. Richter, Ph.D., and David T. Katz, M.S., Baltimore, Maryland. In the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 122:10:651, July 3, 1943.

In previous papers a method was described by means of which areas of high and low electrical skin resistance can be quickly and accurately defined on all parts of the body. This method was first applied to the delineation of areas of skin denervated by sympathectomy. These areas did not sweat and had a very high electrical resistance. A sharp line, usually less than ⅛ inch in width, separated the normal areas of low skin resistance from the affected areas of high resistance. Removal of the sympathetic ganglions at any given spinal level produced definite skin resistance patterns which closely conformed to the corresponding sensory dermatomes. This method made it possible to determine exactly the area affected by sympathectomy and the presence of regeneration of the sympathetic nerves.

*Summary*

1. By means of the electrical skin resistance mapping test and procaine injections of the ulnar nerve at the elbow, the ulnar field of sympathetic innervation was defined in 6 normal persons.

2. By means of this test the affected areas of skin were sharply delinated on 10 patients with ulnar lesions of recent and long standing produced by accidental cuts, intentional stabs, compression from fractures or by bomb and shell fragments.

3. The simplicity, accuracy and speed of the method make it useful for the exact examination of all types of peripheral nerve lesions, for the determination of the effects of nerve sutures and different kinds of treatment.

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### Teaching of Physical Medicine in Relation to the War Effort

By Frank H. Krusen, M.D., and Earl C. Elkins, M.D., Rochester, Minnesota. In ARCHIVES OF PHYSICAL THERAPY, 24:9:556, September 1943.

It is important to stress the fact that modern physical therapy is entirely different from the physical therapy that was practiced during the last war. Its departments must be properly supervised, properly staffed and properly equipped. The modern military physical therapy department is of such great importance and handles such a high percentage of patients that it never should be left in the hands of technical aides. Nominal supervision by a physician who devotes his time to some other specialty is not satisfactory in meeting present day demands.

Because of the remarkable development of physical therapy during the first World War its growth was greatly increased during the ensuing years of peace. World War I gave the first great impetus to the advancement of physical therapy. If the teaching of physical therapy is properly organized during this war, there is an opportunity to give still another tremendous lift to this important phase of medical practice. This opportunity must not be neglected.

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### The Treatment of Painful Feet

By Robert P. Montgomery, M.D., Milwaukee, Wisconsin. In the WISCONSIN MEDICAL JOURNAL, 42:8:788, August 1943.

*Development of Foot Muscle Strength*

The object of treatment is to correct as far as possible the various causes for fatigue and to lessen the strain on the feet by proper use of the feet in walking and standing. If the feet are used in a normal heel-toe gait with the feet pointing straight ahead, the muscles supporting the arches will be strengthened as the feet are used. Temporary aids, such as adhesive strapping, padding inside of shoes, and alterations on the outside of the shoes, sometimes are necessary. As the abnormal positions of the feet are corrected, the calluses and corns disappear without other treatment.

*Aids for Painful Feet and Legs*

Acutely painful feet and aching leg muscles can be readily relieved by relaxation in a tub of warm water for one or two minutes followed by elevation of the legs above the water level for a

similar length of time. Five to ten changes in position usually are adequate. An additional aid easily can be added by voluntarily dorsiflexing the feet, bending the toes toward the soles of the feet and at the same time turning the soles of the feet towards each other while the legs are elevated. These positions would be maintained throughout the two minutes period of elevation. They assist the position of elevation and the coolness of the air against the moist skin in driving the blood from the muscles and, by so doing, allow a greater volume inflow of blood when the legs are relaxed. This rapid exchange of large quantities of blood into and out of the tired leg muscles in the form of vascular massage is very comforting.

Sometimes, but rarely, developmental abnormalities and other complicating factors of foot strain require such treatments as manipulations under anesthesia, the wearing of plaster casts, and operations.

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## Management of Poliomyelitis

From Medicine and the War, J.A.M.A., 123:13:-841, November 27, 1943.

The War Department, Washington, D. C., recently released Circular Letter No. 175, regarding the management of poliomyelitis.

*Acute Phase.*—Local measures. Careful nursing attention must be provided to maintain the affected parts of the body in the most desirable physiologic position, with the least discomfort to the patient. Application of heat to the involved muscle groups is desirable for the relief of pain and tenderness. Heat may be applied by a variety of means, but hot packs probably are of most value.

*Subacute Phase.*—Appropriate orthopedic and/or physical therapy procedures should now be instituted to prevent deformities and to maintain physiologic position. During this period, when muscles are tender and painful, passive movements within the limit of tolerance, as manifested by increased pain, should be instituted by qualified physical therapy aides under the careful direction of medical officers. The physical therapy measures needed include only those conventional methods which have received general acceptance and are in common use. Active motion, when found to cause increased pain and tenderness, should be discouraged. All local therapy should be limited to the involved parts as manifested by pain, tenderness, hypertonicity or paralysis.

*Convalescent Phase.*—Both orthopedic and physical therapy measures should be adopted which will enhance this recovery in every way possible. These measures will include mechanical support of the affected parts and physical therapy treatment such as massage, radiant or other heat and exercise of passive, assistive, active or re-educational character, depending on the degree of weakness and extent of paralysis.

*Chronic Phase.*—Further corrective measures will ordinarily become the function of orthopedic surgeons.

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## The Kenny Treatment in Acute Poliomyelitis

By James E. Dyson, D.M., Des Moines, Iowa. In the JOURNAL OF IOWA STATE MEDICAL SOCIETY, 33:8:379, August 1943.

On July 29, 1942, the Iowa Lutheran Hospital in Des Moines, a pavilion for the treatment of acute infantile paralysis during the contagious stage was dedicated by Sister Elizabeth Kenny and named "Kenny Cottage" by her. During the year thirty-nine patients have been admitted with acute poliomyelitis in different stages and lengths of time after the onset. The varying symptoms and responses to treatment have been revealing to us.

Muscle spasm is painful, and if the Kenny treatment did nothing more than relieve the patients of their pain it would be well worth using.

The tabulation of the thirty-nine acute cases brings to attention the age of the patients; none were infants and many were past childhood. It shows that seasonal predominance is July to November. We had two children who were attacked in January. The table shows the length of hospitalization and in many instances spinal fluid cell count. It also shows that practically every patient had neck and back spasm, nearly all had hamstring muscle spasm, and a large number had gastrocnemius muscle spasm.

Since not all weakness is paralysis, we have chosen to list the muscle weakness at the onset as such. The condition of all patients at this writing (July 1943) is difficult to report. We have had our patients return for checkups and feel it is important to do so, since overactivity has brought back muscle spasm and changed functions of arms, backs, and legs in some who thought they were well.

We have treated thirty-five patients who suffered from the illness in previous years who are not listed in the table. Some patients who were attacked one and two years ago have been improved to the extent of walking without braces; many have had incoordinations corrected by muscle reeducation.

## A Comparative Study of Muscle Atrophies Caused by Denervation and Acute Inanition

By H. M. Hines, J. D. Thomson and B. Lazere. In the AMERICAN JOURNAL OF PHYSIOLOGY, 140:1:118, October 1943.

*Summary*

A comparative study was made of atrophies due to acute inanition and denervation in the tibial nerves and gastrocnemii of albino rats. No evidence was found that prolonged acute inanition resulted in "functional denervation" of skeletal muscle. The muscles of fasting animals did not exhibit characteristics typical of denervation atrophy, such as the presence of fibrillary activity and the contracture response to acetyl choline injections. Nerve stimulation elicited the same amount of tension relative to that from direct activation in both fasted and well nourished animals. The regenerating nerve fibers of fasted animals were able to make functional contacts with muscle units quite as effectively as those of well nourished animals.

## Electrolytic Action in Dental Appliances

By Alexander R. MacGregor, M.B. CAMB., L.D.S., and B. W. Fickling, F.R.C.S., L.D.S., London, England. In LANCET, 10 of Vol. II, 1943:291, September 4, 1943.

*Summary*

In three cases of fractured mandible treated by bone-grafting and extra-oral fixation, electrolytic action developed between the copper-silver dental splint and the chromium plated steel pins, causing ulceration, bone necrosis and very delayed healing. The graft survived in each case but a sequestrum formed ½-1 in. around the pin-holes. Electrolytic action also may account for ulceration around screws, projecting points and soldered junctions on intra-oral splints. Preventive measures include the use of nonconductive plastic materials in connecting bars and stainless steel pins and screws.

## The Influence of Muscular Work and Fatigue on the State of the Central Nervous System

By Ernst Simonson, M.D., Norbert Enzer, M.D., and Roy W. Benton, M.D., Milwaukee, Wisconsin. In the JOURNAL OF LABORATORY AND CLINICAL MEDICINE, 28:13:1567, October 1943.

*Introduction*

The reciprocal relationship between muscular fatigue and fatigue of the central nervous system has theoretical interest and practical application. Most industrial occupations involve muscular work as well as functions of the central nervous system. Hence, the development of general fatigue in industry depends on the influence of both systems on one another. It would seem that knowledge of this relationship could be useful in military affairs, since there are many occupations and situations in which fatigue of the central nervous system contributes to general fatigue arising out of muscular strain or effort. Concerning this question, no experimental material is available, so that Ivy in a recent review states only, "As is well known, heavy muscular exercise influences mental performance because of the tendency to fall asleep." It would be practical to know what amount of muscular work is necessary to produce a depressing effect on the central nervous system, how long the effect lasts, and whether the type of work is an influencing factor. From a theoretical point of view it would be interesting to investigate the mechanism of the depressing effect. While the depression of the central nervous system by muscular fatigue has been generally accepted as a fact on the basis of subjective experience, little is known of the effects of short, moderate muscular work on the state of the central nervous system.

*Summary*

The reactions of the fusion frequency of flicker of 54 normal subjects after four different types of exercise of increasing severity ("a," static exercises; "b," 30 genuflexions; "c," pulley exercise; "d," running) were studied. Each exercise produced definite deviations of the fusion frequency of flicker. The majority of normal people (about 80 to 90 per cent) respond with an increase of the fusion frequency after static exercise and 30 genuflexions, and with a decrease of the fusion frequency after running. After pulley exercise, about 40 per cent of the subjects respond with both increase and decrease. The magnitude and the duration of the depression correspond to the severity of exercise. These results may explain the depressing effect of physical fatigue after severe muscular exercise, and the stimulating effect of short, moderate exercise on the state of the central nervous system. The endurance of women in static exercise, pulley exercise, and running is significantly lower than that of men, while there is no significant difference of the reaction of the fusion frequency of flicker. The response of the fusion frequency of women after an equal amount of work (30 genuflexions) appears to be inferior to that of men.

## Wartime Physical Rehabilitation (I)

From War Med. 2:824:829, Sept. 1942. In the PROCEEDINGS OF THE STAFF MEETINGS OF THE MAYO CLINIC, 18:18:326, September 8, 1943.

*Comment*

In time of war it is essential that the medical profession pay careful attention to the problem of rehabilitation of the wounded. It seems apparent that we are now well launched on our own equivalent of the British "Tomlinson plan." Our American "medical rehabilitation" workers will be well trained physical and occupational therapy technicians working under the direct supervision of specially trained physical therapy physicians. We are well along with our training program which has made tremendous strides on a national scale, but we are far from achieving our goal of supplying an adequate number of trained reconstruction workers (medical and technical) to meet war needs. We must continue unrelenting efforts to enlarge and perfect our physical rehabilitation program.

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## The Kenny Versus the Orthodox Treatment of Anterior Poliomyelitis

By J. Albert Key, M.D., St. Louis, Missouri. In SURGERY, 14:1:31, July 1943.

*Comment*

The most important difference between the Kenny and the orthodox methods of treating poliomyelitis is that in the Kenny method emphasis is placed upon muscle spasm as the most important feature of the disease and efforts are made to relieve this spasm by hot fomentations, while in the orthodox method flaccid paralysis of muscles is considered the most important feature of the disease and efforts are made to protect and restore function to the paralyzed muscles. The other two symptoms which are stressed by Miss Kenny (incoordination and mental alienation) are recognized under different names, but are treated in much the same manner under each method. However, we believe that early active exercise of muscles is harmful and tends to prolong the stage of tenderness and contracture and we do not begin our muscle training until these symptoms have subsided, while Miss Kenny begins her muscle training as soon as possible after the diagnosis of poliomyelitis is made. We also consider splints a useful adjunct to our treatment where they are indicated.

The symptoms which Miss Kenny calls muscle spasm are recognized and treated in the orthodox method, but they are called rigidity and muscle contracture and are treated by immobilization in splints or casts to relieve the pain and prevent contractures and the development of deformities. In anticipation of the criticism that even though orthodox treatment has recognized the so-called muscle spasm it has failed to emphasize and treat this symptom, I wish to state that rest is probably the most important therapeutic measure in our armamentarium and that in order to put a muscle at rest we immobilize the part. Consequently, we treat the tender, painful contracting muscles by rest. This is obtained by our splints or casts. The reason we have not emphasized these symptoms is that they tend to subside when the limb is put at rest. The tendency of the muscles to contract (so-called muscle spasm) subsides when the pain and tenderness disappear and if deformities are prevented this symptom is rarely an important problem under orthodox treatment. It has not been emphasized because it subsides spontaneously.

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## Refrigeration Anesthesia in Skin Grafting

By Lt. Harry E. Mock, Jr., Med. Corps, U. S. Army. In the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 122:9:598, June 26, 1943.

Refrigeration anesthesia for skin grafting opens a new field for the use of reduced temperatures in surgery. In 27 cases requiring small or multiple small split thickness skin grafts this method was used. Pinch grafts could be removed equally well, although none were attempted in this series. Results were so satisfactory that this report is submitted for general consideration.

*Technic*

Two hours before operation, one or more uncovered ice bags are applied directly to the area from which the skin is to be taken. The number of ice bags required depends entirely on the amount of skin to be anesthetized. Slight pressure deepens the anesthesia, so it has been our practice to tie or bandage the ice bags in place. The donor site may be marked and orders left for the nurse to apply the ice bag or bags at the desired time. In hot weather they may have to be refilled, but usually they are not disturbed until the surgeon is scrubbed and ready to prepare the skin. The maximum anesthetic effect lasts approximately twenty minutes after the ice bags have been removed.

*Summary*

A new use of reduced temperatures in surgery, namely anesthesia of skin graft donor sites by refrigeration, is recommended because it is simple, time saving and efficient. It has been used in 27 cases.

### Foot Problems in Wartime

By Henry H. Jordan, M.D., New York, New York. In ARCHIVES OF PHYSICAL THERAPY, 24:9:531, September 1943.

With hesitation I approach the subject of physical therapy in common disorders of the foot. The role of physical therapy for the treatment of foot disabilities as discussed in this paper must be a limited one. Most authors who have made a careful study of the foot in stance and locomotion agree that in the majority of cases there is no indication for building-up exercises. I know that the public has been educated to regard foot exercises as an important factor in routine hygiene as well as in the treatment of foot disorders, but a convincing number of examples show that in the most common disorders the musculature is not at fault. Physical therapy, of course, has its undisputed significance in the treatment of inflammatory and circulatory disturbances of the lower extremities. Among the pathologic conditions that can be greatly improved by physical therapy, I mention myogeloses in the fatigued musculature of the lower leg and some frequently overlooked disorders of the structure of the sole of the foot, such as infiltration and spasms in the short flexors and in the abductor of the great toe, and fibrositis. Histamine ion transfer has proved to be of superior value in these conditions.

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### Fact and Fancy in Poliomyelitis

Editorial. In BRITISH MEDICAL JOURNAL, No. 4308:141, July 31, 1943.

In no field of neuropathology has advance been more rapid than in the case of poliomyelitis, and the successive additions to our knowledge within the past few years necessarily have involved the abandonment or modification of earlier views on such subjects as the portal of entry of the virus, the site and nature of the essential lesion, and the bases of the characteristic clinical variants of the malady. These advances have been pursued with great eagerness, and it cannot be said that those interested in the many problems surrounding poliomyelitis have been unreceptive to fresh ideas. Anything that offers to increase our control over so grave and disabling a disease may be sure of the most careful and favorable consideration. Yet it is in the realm of treatment that it is always most difficult to secure the dispassionate assessment of results that is so essential to rational therapy, and it is fair to say that already the ideas and methods associated with the name of Sister Elizabeth Kenny have become matter of animated controversy. This controversy has now reached a further stage in the publication by an American orthopedic surgeon in collaboration with Sister Kenny of a considerable volume on the new concept of poliomyelitis formulated by the latter and on the methods of treatment she advocates.

Whatever measures of practical benefit may follow from the use of Sister Kenny's methods, her "entirely new concept" must stand or fall on its merits as a necessary and adequate generalization of the facts, though not necessarily as these are stated by her. Her methods may well be useful but her concept erroneous. The allowances we may be disposed to make for her presentation of her concept, in view of the difficulties arising from the fact that Sister Kenny has no medical training, do not relieve us from the obligation of assessing this by the proper standards applicable to all medical theories; and that Doctor Pohl sponsors the concept makes it the more necessary to scrutinize it critically, in view of his experience as an orthopedic surgeon.

The problem of pain and tenderness in the affected muscles of poliomyelitis is one that has never been faced. It calls for some explanation, but none has ever been seriously attempted. The same is true of the tenderness of muscles in other lesions affecting the lower motor neurone, and it may be thought of as matter of reproach that we have so long evaded the questions raised by this striking symptom. That pain and tenderness in muscles add to the sum total of their weakness, and may even influence the efficiency of other muscles normally associated with them in coordinated movement, is possible. It also is possible that the relief of spasm and of pain by hot applications brings relief to the patient and may facilitate the use of such motor functions as the muscles possess. It is further reasonable to suppose that the intensive care and superb nursing that are stated to be a part of Sister Kenny's methods will yield better end-results than the somewhat perfunctory treatment that not rarely attends the later stages of the illness in cases of poliomyelitis. But all this is a far cry from the extreme claims made for the treatment and a matter unrelated to the theoretical concept of the disease poliomyelities that has been built on these irrelevant considerations.

It would have been better had Sister Kenny and her supporters been content to subject her methods to adequate and prolonged trial, and to have let them stand or fall by their merits. The situation has been unnecessarily and adversely complicated by the intrusion of theoretical fantasies that can only prejudice the issue.

## The Kenny Treatment for Infantile Paralysis

By Robert Bingham, M.D., New York, New York. In the JOURNAL OF BONE AND JOINT SURGERY, 25:3:650, July 1943.

*Conclusions*

1. Forty-eight patients with infantile paralysis in 1941 have been treated by the methods of Sister Elizabeth Kenny of Australia, with encouraging and significant results when compared with twelve patients treated by older methods.

2. The presence of the symptoms of muscle spasm, mental alienation and incoordination in the acute stage of the disease has been verified.

3. The important role of untreated muscle spasm in forming muscle contractures and producing deformities has been demonstrated.

4. Treatment by means of bed rest in a natural position, hot moist packs, passive motion, and muscle reeducation has proved successful in relieving these early symptoms when given as Sister Kenny has described.

5. Immobilization by casts or splints is not necessary for the protection of weak muscles or to prevent deformities, and is actually harmful in prolonging muscle spasm and preventing the use of the Kenny routines.

6. Patients receiving the Kenny treatment are more comfortable, have better general health and nutrition, are more receptive to muscle training, have a superior morale, require a shorter period of bed rest and hospital care, and seem to have less residual paralysis and deformity than patients treated by older conventional methods. The Kenny treatment is the method of choice for the acute stage of infantile paralysis.

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## The Unfitness of Young Men in Motor Fitness

By Thomas K. Cureton, Ph.D., Urbana, Illinois. In the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 123:2:74, September 11, 1943.

There is evidence to show that a large proportion of young men entering college from high school are unable to handle their bodies with the degree of efficiency needed in wartime. This situation reflects the protected softness of their lives and the inefficiency of educational programs to produce an acceptable level of motor fitness, undoubtedly due to inadequate time allotment, facilities and leadership as well as the types of program offered in the schools. In wartime, physical education is charged with preparing young men for hard physical work in industry or military service. Motor fitness may be demonstrated by means of stunts or performances with the body, thus showing that it can be controlled and balanced in various positions, that it is supple and normal in all major joints and that it is strong in the trunk and limbs; also that it is agile in climbing, jumping, crawling or dodging with speed, that it can develop a highly powerful effort if necessary and that it possesses stamina in a variety of endurance feats involving long continued effort and recuperation.

In September 1942, 2,628 entering men into the University of Illinois, fresh from the high schools of Illinois and nearby states were tested for motor fitness. The gross classification resulted in 35.84 per cent being classified in the basic group, failing to pass the test; 23.71 per cent were put into the restricted group as near failures; 40.45 per cent were rated satisfactory.

Several important implications of the results may be pointed out:

1. The deficiency of large numbers of young men in fundamental motor ability traits of balance, flexibility, agility, strength, power and endurance is a fact. The proportions of motor unfitness are appalling.

2. Physical training programs are not compensating rapidly enough for urbanization with its associated mechanization, indoor work, dependence on motor vehicles and lack of the necessity of hard physical work in youth.

3. Large numbers of young men are entering adult life unconditioned and unmotivated to maintain physical fitness.

4. Physical education and recreational programs have been inadequate, possibly because of inadequate time, facilities and leadership.

5. Basic motor fitness training would include deliberate emphasis on ability in a wide range of activities for balance, flexibility, agility, strength, power and endurance, apart from health knowledge, rules of the game, social play relations or form in refined physical skills.

6. The fact that 60 per cent of those failing to pass the motor fitness test cannot swim 100 yards, and 85 per cent of these cannot swim 440 yards, is a deplorable fact which indicates lack of organization in the schools to teach the important skills of swimming. Thousands of drownings in the war are directly attributable to this omission.

7. Physique is an important base for evaluating physical fitness.

8. These facts imply the great importance of physical fitness work from the dynamic approach as used in physical education. The findings suggest a fruitful area of work of primary importance from the health and safety point of view.

## The Care of the Knee Following Excision of a Meniscus

By Lt. Col. Samuel R. Terhune, Maj. Thomas S. Eddleman, Maj. Samuel B. Thompson, and Capt. Benjamin S. Read, Med. Corps, U. S. Army, Camp Polk, Louisiana. In the JOURNAL OF BONE AND JOINT SURGERY, 25:3:669, July 1943.

*Summary*

From a study of seventy patients who have been operated upon for injury to a meniscus, the authors conclude that careful supervision of daily active physical therapy, which is started immediately after the operation and is carried out by the patient himself, is the best method of obtaining perfect joint function. The methods of obtaining quadriceps tone and a full range of joint motion are discussed.

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## Climate and Disease

C. A. Mills, M.D., Cincinnati. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 123:9:551, Oct. 30, 1943.

Certain fundamental principles of climatic effects should be kept constantly in mind when spa therapy is being considered. In many types of disease the climatic background of a spa will exercise a considerable influence over its possible benefits to the patient. Facts showing just how and why this is true have not been sufficiently appreciated by the medical profession; hence this article, setting forth the pertinent information available.

Mills concludes that plans for spa therapy should not be made without due consideration of possible climatic and weather effects in the region to be chosen. Spas of the nonstormy Southwest are to be preferred for patients with respiratory or rheumatic complaints, while victims of the metabolic or degenerative diseases usually will benefit more in the calming warmth of the Gulf coast. For low vitality patients of tropical or subtropical areas, a summer sojourn in northern coolness works wonders; however, they should beware of the cold and storms of northern winters. Each patient constitutes a separate problem in his relation to climatic environment; hence final decision must be made by the physician in charge. In reaching that decision the physician should be guided by the general principles of climatic and weather effects here set forth.

Mills also states that the therapeutic duties of a physician can no longer be concerned simply with the specific treatment of the disease at hand. He should look further afield for the larger forces affecting his patient's welfare and future health. And, among the outside forces bearing on these more general aspects of existence, climatic and weather influences are of great importance. The most perfect diet cannot lead to physical vigor and high vitality unless the heat generated in its use can be readily dissipated from the body. The physician of the future therefore will need to develop more deeply his interest in, and knowledge of, climatic and meterologic influences affecting man throughout his existence in the different regions of the earth.

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## The Importance of Health Resorts and Their Facilities in Medical Preparedness

Major General Charles R. Reynolds, United States Army, Retired. In J.A.M.A., 123:13:832, November 27, 1943.

General Reynolds states that the importance of health resorts in medical preparedness must be considered in connection with the military situation, the hospitalization plan and policy governing the disposition of noneffectives during and after active military operations.

The so-called health resorts without substantial natural therapeutic agents and facilities are of value in medical preparedness only as their physical plants or utilities are available when and where needed to supplement the military housing program.

The value of many of the existing spas for military medical purposes is decidedly influenced by their lack of housing facilities for patients and permanent professional staffs.

The disease groups for which spa treatment is especially efficacious—digestive, cardiovascular and rheumatic—comprise a large percentage of admissions to sick report in the Army.

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## Observations on Injury and Repair of Peripheral Nerves

By Hiram E. Essex and Nilson de Rezende. In the AMERICAN JOURNAL OF PHYSIOLOGY, 140:1:114, October 1943.

*Summary and Conclusions*

Observations have been made in vivo of the repair of the posterior auricular nerve of the rabbit after injury had been done to the nerve in a variety of ways. By the use of transparent chambers and intravital staining, injury and repair of nerves could be observed. The transparent chamber and its application to the ear are described.

Nerves were observed subsequent to crushing, sectioning and grafting with fresh autografts as

well as with fresh and preserved homografts.

Regardless of the nature of the injury to which the nerves were subjected, the first occurrence thereafter was the development of a complex network of blood vessels which formed in the crushed region, or which spanned the gap between the proximal and distal stumps when the nerve was sectioned or when a part of the nerve was resected. Similarly when a graft was placed in the course of the nerve, it was first completely vascularized whether it was an autograft or a fresh or preserved homograft. Repair of the nerves occurred more rapidly when fresh than when preserved grafts were used.

The results of the work presented strongly emphasize the importance of the circulation in the regeneration of nerves and suggest that after injury to nervous tissue every effort should be made to provide an adequate blood supply for the injured nerves in order that their repair may be facilitated.

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# Book Reviews

*BAROMETRIC PRESSURE: RESEARCHES IN EXPERIMENTAL PHYSIOLOGY. By Paul Bert. Translated from the French by Mary Alice Hitchcock, M.A., formerly Professor of Romance Languages at the University of Akron, and Fred A. Hitchcock, Ph. D., Associate Professor of Physiology at the Ohio State University. Cloth. Price, $12. Pp. 1055, with illustrations. Columbus, Ohio: College Book Company, 1943.*

Although originally published in 1877 this work is a classic. One wonders how such a valuable book could have remained so little known for so many years. The whole field of medicine, especially physiology, owes a great debt to the translators.

The presentation of this volume is particularly pertinent to the problems of aviation medicine. This book stands as the very cornerstone of modern altitude physiology. The great Italian scientist, Angelo Mosso, did not agree with the conclusions of Paul Bert that oxygen-want played a small part in mountain sickness. Mosso believed mountain sickness was due to hyperventilation with a resultant alkalosis—the major symptoms being due to acapnia. Few in the present century except Yandell Henderson have paid much attention to Mosso, but we are now just beginning to appreciate and heed his views.

One could well afford to read this book alone for its masterly presentation of historical facts, his orderly and logical presentation of his experiments and their interpretation. Concerning accuracy of experimental data he writes: "But the height of absurdity . . . is to claim to give to these other methods an appearance of precision which they do not possess, carrying calculations to the second and third decimal and even resorting to a table of logarithms to get more decimals. This charlatanism of decimals, which leads one to claim exactness for the thousandths in a number which is wrong beyond the units, is an illusion which must be avoided." This volume is written in such a style that one is reluctant to lay it aside once reading is commenced. The book is highly recommended.

*RESEARCHES IN CLINICAL PHYSIOLOGY. By Sir Almroth E. Wright, M. D., F.R.S., Director of the Inoculation Department and Principal of the Institute of Pathology and Research, St. Mary's Hospital, London; Corresponding Member of the Académie des Sciences; Honorary Fellow of Trinity College, Dublin. Cloth. Price, 12s. 6d. Pp. 163, with 2 illustrations. London: William Heinemann Medical Books, Ltd., 1943.*

This volume consists of a collection of papers published by the author from 1891 to 1905. The chief subjects treated are the feeding of infants with diluted citrated cow's milk; the arrest of hemorrhage; the reduction of excessive transudation through the capillaries; the all but immediate reopenings of veins when blocked by recent thrombosis; and the proceedings to be employed to deal with respiratory collapse. These subjects the writer feels rightfully belong to the field of physiology and should be so taught. The clinician, he states, is a poor teacher of these subjects because he is unacquainted with the physiological and pathological principles involved. The purpose then of the book is to bring together in a single volume all these papers so that the student may acquaint himself with these principles. This volume is not likely to find a very fertile field in this country. Most of the material presented in this work is taught in both the physiology department and departments of physiological chemistry in the modern medical schools of the U.S.A. This was not true, however, when the author wrote his original articles. Nevertheless, much of the material presented could provoke a heated discussion as to the advisability of the measures recommended. For the average physical therapist the book is not recommended unless she is particularly interested in internal medicine.

*CHILDREN CAN HELP THEMSELVES: THE NORMAL CHILD'S HEALTH BEHAVIOR. By Marion Olive Lerrigo, Ph. D. Cloth. Price, $2.75. Pp. 219. New York: The Macmillan Company, 1943.*

This compact book is written by one who obviously is well founded in the management and training of children. It covers the life of the child at chronologic intervals from one month to eleven years. At each period various aspects of life are considered, for example, eating, sleeping, elimination, exercise and play, learning about the world, emotional and social development.

The form of the book merits high praise. It is written in simple language with considerable conversation and humor interspersed. There is enough latitude in the author's descriptions to permit parents to have a wholesome view of variations of the normal. In a sensible fashion it deals with personality development without complicating it with unnecessary verbiage or technical analytical terminology. It is one of the best books recently written about the care of the normal child. It is unhesitatingly recommended to all parents.

*PICTORIAL HANDBOOK OF FRACTURE TREATMENT. By Edward L. Compere, M. D., F.A.C.S., Associate Professor of Surgery, Northwestern University Medical School; Chairman, Department of Orthopedic Surgery, Wesley Memorial Hospital; Consulting Orthopedic Surgeon, Chicago Memorial Hospital, and Sam W. Banks, M. D., Associate in Surgery, Northwestern University Medical School; Attending Orthopedic Surgeon, Chicago Memorial Hospital. Cloth. Price, $4.25. Pp. 351, with 171 illustrations. Chicago: The Year Book Publishers, Inc., 1943.*

This book is one of a series called "General Practice Manuals." The automobile and mechanized warfare have increased tremendously the incidence of fractures, dislocations and other injuries to the skeletal system of the human body. Multiple fractures are common. Severe trauma to the soft tissues may accompany and complicate the fractures or dislocations. Compound fractures are more common today than at any previous time. It is well known that wise and skilful management of these injuries may mean the difference between complete recovery and lifelong invalidism.

Most of these injuries are first seen by general practitioners. This book, according to the authors, has been prepared for the conscientious overworked country physicians, general practitioners and medical students.

This monograph is of special value to these medical men for two reasons: first, the many and excellent illustrations, and second, one method is well presented and illustrated to treat each injury. These principles and methods are the ones by which the authors have been able consistently to obtain satisfactory end-results.

This book should be in the library of every general practitioner and medical student as it provides a mental and visual picture of the actual steps required to reduce, immobilize and provide intelligent after-care for each of the more common fractures and dislocation injuries.

*VICTORIES OF ARMY MEDICINE. SCIENTIFIC ACCOMPLISHMENTS OF THE MEDICAL DEPARTMENT OF THE U. S. ARMY. By Edgar Erskine Hume, Colonel, Medical Corps, U. S. Army. Cloth. Price, $3. Pp. 250, with illustrations. Philadelphia: J. B. Lippincott Company, 1943.*

Modern wars are fought, not merely by the armies, but by the whole embattled nations. So, too, the Medical Department of the United States Army is even now taking unto itself a very large proportion of the American medical profession.

From the first days of the Continental Army, our own military physicians have been in the vanguard of scientific exploration. An American military surgeon, John Jones (1729-1791) of New York wrote the first American textbook on surgery. It was published in 1776.

Standing in the front rank of the thrilling achievements of the U. S. Army Medical Corps is perhaps Walter Reed's proof that yellow fever is transmitted and spread by the mosquito. This may have overshadowed many other contributions to our daily health made by army physicians. Colonel Hume gives these their proper perspective in man's fight against disease. The Army was the first to fight smallpox through vaccination during the War of 1812. An Army physician, William Beaumont, serving on a frontier post, gave the world more complete and accurate information about digestion than had been learned through all preceding history. Modern purification of drinking water is derived from methods discovered and developed by the Army.

The Army physician has added valuable work in the use of ultraviolet light, in tuberculosis control, studies in ventilation, nutrition and diet. These and many other achievements make this a history of the Army Medical Department that should be read by everyone going into that department for the war.

*RELEASE FROM NERVOUS TENSION. By David Harold Fink, M. D. Cloth. Price, $2. Pp. 232. New York: Simon and Schuster, Inc. 1943.*

This is another book on pseudopsychiatry but it at least has the merit of being written by a physician with psychiatric training. It is intended as a guide for the individual who is beset by emotional problems so that he may find peace and satisfaction in living. The author has the ability to write down to the popular level and can take sufficient liberties with scientific facts so as to distort them for their dramatic value. The book is presented in simple conversational style and is a masterpiece of confusion of all the various schools of psychiatric thought.

In his foreword he states: "Man's darkest continent is the human mind. In 1912, I decided to explore it." If this book is the result of his exploration then the reviewer fails to see any original contribution by the author. The first four chapters deserve credit for being a good discussion of the somatic repercussions of emotional problems. One can appreciate some value coming from this. There are three chapters on progressive relaxation (with Edmund Jacobson's name being brought in as an afterthought even though he deserves the doubtful credit for describing the procedure). In the later chapters the author lays down rules and regulations of living which seem quite artificial. There is a chapter on self-analysis which would serve to cause Freud to turn in his grave. His confused understanding of Pavlov's concepts and those of psychoanalysis is obvious. He even has a chapter on "Words Are Triggers to Action" which does not give credit where it belongs.

Although this book is easy to read and in places even entertaining it still suffers from the fallacy of trying to dramatize (and capitalize?) on personalized form of treatment.

*ORTHOPEDIC SUBJECTS. Prepared and Edited by the Subcommittee on Orthopedic Surgery of the Committee on Surgery of the Division of Medical Sciences of the National Research Council. Cloth. Price, $3. Pp. 306, with 79 illustrations. Philadelphia: W. B. Saunders Co., 1942.*

This volume is one of a series developed under the auspices of the Division of Medical Sciences of the National Research Council to furnish the medical departments of the United States army and navy with compact presentations of necessary information in the field of military surgery.

This manual is divided into four parts. The first part by Paul B. Magnuson, M. D., discusses ununited fractures. This part is of interest to physical therapists as Doctor Magnuson says that when it is decided that nonunion exists and surgery is necessary, it often is advisable, in preparation for surgery, to apply a light splint which will permit active exercise but will prevent deformity. He then discusses physical therapy preliminary to operation.

The second part on "Injuries of the Spinal Column" is a contribution by Dr. Arthur G. Davis. Section III on "Compound Fractures" is by J. Albert Key, M. D., and the final section is on "Osteomyelitis" by the same author.

In this series there are five other volumes: plastic and maxillo-facial surgery; ophthalmology and otolaryngology; abdominal and genito-urinary injuries; burns, shock, wound healing and vascular injuries; and neurosurgery and thoracic surgery. This series of texts presents in compact form essential up-to-date and reliable information regarding military surgery.

This series is highly recommended to any surgeon because their application is not confined to military surgery, for most of the wounds and injuries of modern warfare may be duplicated in civil emergencies.

*MANUAL OF DERMATOLOGY. By Donald M. Pillsbury, M. D.; Marion B. Sulzberger, M. D., and Clarence S. Livingood, M. D. Issued under the Auspices of the Committee on Medicine and Medical Sciences of the National Research Council. Cloth. Pp. 421, with 108 illustrations. Philadelphia: W. B. Saunders Company, 1942.*

The latest available figures of the U. S. Army (1940) indicate that skin diseases produced 9.8 per cent of all admissions to the sick list and 10.41 per cent of all days lost. Venereal disease (exclusive of gonorrhea), i.e., syphilis, chancroid, lymphogranuloma venereum, etc., were responsible for an additional 3 per cent of all admissions. It is to be recalled that these all are peacetime figures, and that the diseases in these groups have always experienced a rapid relative increase under conditions of military expansion and actual warfare.

This manual was prepared by Lt.-Comdr. Marion B. Sulzberger, Medical Corps, U. S. Navy; Donald M. Pillsbury, Consultant in Dermatology to the Committee on Medicine of the National Research Council; and Major Clarence S. Livingood, Medical Corps, U. S. Army. This manual sets forth briefly and simply the management of dermatoses encountered in the armed forces. Emphasis is placed upon the skin diseases affecting adult males. No rare diseases are discussed nor any untried methods of treatment given, and no discussion of the histopathologic features of skin disease is made. It is a book that all physicians in the armed forces should have for study.

*THE THERAPY OF THE NEUROSES AND PSYCHOSES: A SOCIO-PSYCHO-BIOLOGIC ANALYSIS AND RESYNTHESIS. By Samuel Henry Kraines, M. D., Associate in Psychiatry, University of Illinois, College of Medicine; Assistant State Alienist, State of Illinois; Diplomate of the American Board of Psychiatry and Neurology; Captain, United States Army Medical Corps. Cloth. Price, $5.50. Pp. 567. Philadelphia: Lea & Febiger, 1943.*

The author presents his somewhat ecclectic form of therapy in this book. It is an attempt to bring together the various schools of thought into a useful relationship where the practicing physician may learn to approach his patient as a person who is not only harrassed by life but also struggles with his own drives. The subject is approached rather differently than other textbooks of psychiatry.

The first chapter is devoted to a classification of psychiatric states. Considerable effort is spent on a classification of psychoneurotic symptoms into two groups, namely tension and symbolic. The effort to get away from the rigid classification of the psychoneuroses is commendable but it appears that there has been substituted another symptomatic classification the use of which escapes the reviewer. There is said to be some purpose in it, but it seems to have little application from his own descriptions.

Chapters two, three and four discuss the psychology of the psychoneuroses and the development of various types of symptoms. The chapter on sex drives is a step in the right direction of making such material available in understandable form. However, the author unfortunately injects his own limited interpretation into the conception of sexual problems as the cause of emotional disturbances. One is more impressed with his crusade against Freudian interpretations rather than by any positive value in his own superficial minimizing ideas. He makes the problem too simple and from the examples the novice would be led to expect great achievements by simple procedures.

In the next six chapters is found a discussion of the principles of psychotherapy and their applications. Of particular value is the section on principles of psychotherapy because the aims are well described. Again the author proceeds to confuse this with his half-hearted acceptance and use of such things as free association and dream analysis. He uses the armamentarium of the psychoanalyst but tries to dissociate himself from them. Surprisingly he has overlooked the whole concept of transference. The use of clinical examples is good and there is much common sense, for example, in indicating that many cases can profit from brief therapy. One is struck by the frequency with which suggestion, direct advice and manipulation of the environment are used. One also carries away the idea that psychotherapy rarely can miss its intended goals.

Chapter fourteen is an account of psychosomatic diseases. It is brief and descriptive but does not offer the knowledge gained from a clear understanding of dynamic psychiatry. There are five chapters on the formal concepts of clinical entities of the psychoses and the psychopathic states. The final chapter is devoted to neuropsychiatric states in war time. It contains much material of current interest, and is well done.

There is considerable to be gained from this book, particularly for the general practitioner who wishes some orientation in psychiatric treatment. This could be greatly enhanced by condensation and avoidance of repetition. The numerous cross references are usually unimportant and only confuse the reader. Finally it is suggested that he make less of an issue of antipsychoanalysis and devote the energy to make his recommended approach more lucid and attractive because it has something to offer.

*BEHAVIOR AND NEUROSIS. By Jules H. Masserman, M.D. Cloth. Price, $3. Chicago, Illinois: The University of Chicago Press, 1943.*

The author has produced an admirable book, reviewing the whole field of experimental neurosis. The book is arranged in a logical fashion so as to give the reader a clear view of the goals in mind.

The first chapter on historical introduction and general principles is valuable, especially wherein he discusses the differences between the dynamic and mechanistic concepts of behavior. Chapter two is a description of the apparatus used by the author in his own rather extensive investigations of experimental neurosis, particularly in cats. In chapter three there is an interesting summary of the literature on neurophysiologic investigations of behavior in which is reviewed the role of the hypothalamus and cortex in emotional experience and expression. The author's own experiments on the production and treatment of neurosis on cats are presented in chapter four.

The second part of the book is devoted to the literature on the experimental studies of behavior and neuroses. In it is presented a critical study of the Pavlov concepts of conditioned reflexes in reference to psychiatry and wherein they lack the more attractive and logical dynamic concepts.

The final part of the book deals with the clinical and psychotherapeutic applications of the knowledge gained from studies of experimental neuroses. The bibliography at the end of the book is large and well selected and is in keeping with the careful preparation of the remainder of the volume.

This book is a commendable addition to the psychiatric literature. The author attempts to apply laboratory methods to show that the dynamic concepts of psychoanalysis are not merely meaningless terms. He fits the various schools of psychiatry into an understandable whole. The clinical analogies to the experimental work help to show the purposes of psychotherapy.

The book has nothing special to offer to physical therapists but certainly merits being read by psychiatrists and psychologists. The reviewer offers one suggestion which in no sense is a criticism. Simplification of some of the language and sentence structure would make the book even more attractive to the average reader. At times one becomes involved with the meaning of words so as to lose the meaning of the sentence.

*BODY POISE. By Walter Truslow, M. D., F.A.C.S., Consulting Orthopedic Surgeon, Brooklyn Long Island College, St. John's Norwegian, Victory Memorial, Evangelical Deaconess, Kingston Avenue, St. Giles, Brooklyn, N. Y., and Pilgrim State, Brentwood, N. Y. Cloth. Price, $4.50. Pp. 312, with illustrations. Baltimore: The Williams and Wilkins Company, 1943.*

Body poise or body mechanics has always held a leading place in physical fitness and should continue to loom large in our national program. There has gradually been developing a sensible appreciation of the prophylatic effectiveness of the fundamentals of good posture and of the therapeutic value of corrective gymnastics for conditions of widely diverse complaints. Systematic gymnastics plays a leading role in the maintenance of good posture and corrective gymnastics in the restoration of good body poise. This is the theme of this book.

The first part treats of the normal anatomy and the kinesiology in good posture. The anatomy is presented as an "up building," from the soles of the feet to the crown of the head, of the structures necessary for maintaining and using the human frame in normal posture. Under kinesiology it explores the occupational and gymnastic variations from normal posture and the changes in the mechanism which produce these variations.

The author rightly believes that although inadequacy of muscle development and of muscle training constitute leading factors in the derangements discussed in Part II and although muscle reeducation is a potent means in restoring these parts to normal, there are other factors and other methods of treatment which should not be neglected. Therefore, the author in this part discusses the entire treatment and states the place of corrective gymnastics in weak feet, flat feet, metatarsalgia, faulty posture, functional anteroposterior and functional lateral deviations of the spine, and rotary lateral curvature of the spine —scoliosis.

Some leading sports and games in their relationship to body poise are presented in Part III. This volume is recommended to the orthopedic surgeon, the general practitioner, the physical therapist and to all interested in good body mechanics.

*ORTHOPEDIC NURSING. By Robert V. Funsten, M. D., Professor of Orthopedic Surgery, University of Virginia Medical School, and University of Virginia Hospital School of Nursing, Charlottesville, Va., and Carmelita Calderwood, R.N., A.B., Consultant in Orthopedic Nursing, National League of Nursing Education, New York; formerly Supervisor, Orthopedic Service, Iowa University Hospital, Iowa City, Iowa; formerly Clinical Instructor in Orthopedic Nursing, Children's Hospital, Denver, Colo. Cloth. Price, $3.75. Pp. 602, with 181 illustrations. St. Louis: C. V. Mosby Company, 1943.*

This book presents in one volume the background of medical information and nursing technics necessary to assist the nurse in caring for the orthopedic patient. Principles remain constant, only technics vary. Recognizing this, the authors have placed emphasis upon established principles of knowledge and procedure, realizing that such variations as occur in different parts of the country are so manifold that no textbook of this size could take cognizance of all of them.

The skills which are dealt with at length are the necessary manual skills which the orthopedic nurse must master that she may care for the orthopedic patient more intelligently, more efficiently and more skilfully. This is the foreground of orthopedic nursing. These are the alleviative and curative aspects of which Sir Robert Jones said: "It can never be realized too widely that deformity is an unnatural and preventable affliction, which treatment may alleviate or cure, but which a more complete understanding could abolish."

This can be highly recommended as a textbook of orthopedic nursing.

*PAIN MECHANISMS: A PHYSIOLOGIC INTERPRETATION OF CAUSALGIA AND ITS RELATED STATES. By W. K. Livingston, M. D., Lieutenant Commander, United States Naval Reserve. Cloth. Price, $3.75. Pp. 253, with 26 illustrations. New York: The Macmillan Company, 1943.*

During the Civil War, Weir Mitchell and his colleagues, Morehouse and Keen, studied and treated wounded soldiers suffering from injuries. Today the single clinical syndrome arising from nerve injury that is still associated with Mitchell's name is that of causalgia.

This monograph discusses the clinical aspects of pain and particularly the study and interpretation of causalgia and its related states. The first part describes the anatomy of pain pathways; the general concept of "specificity" of cutaneous receptors; the physiology and the psychology of pain. Part two is devoted to the clinical syndromes of causalgia and reflex paralysis; minor causalgia; post-traumatic pain syndromes, chronic low back disability; facial neuralgias, and phantom limb pain. In the last chapter of the second part the author describes the technic of trigger point injection which is the method that he employs for permanently closing the end of a cut nerve. The third part deals with interpretations of protopathic pain, hyperalgesia, the sympathetic component, and the vicious circle.

There are no final conclusions that can be drawn from this study of pain mechanisms in the causalgia states. The subject is too complex, and there are too many questions yet to be answered. This monograph is a personal record of impressions derived from the work of many investigators and the author's observations of pain syndromes over a period of years. These findings should be of practical importance in the treatment of the many cases that will inevitably result from the present world war.

*SOVIET HEALTH CARE IN PEACE AND WAR. By Rose Maurer. Paper. Price, 10 cents. Pp. 48, with illustrations. New York: American Russian Institute for Cultural Relations with the U.S.S.R., Inc., 1943.*

The remarkable war record achieved by the Soviet Union in more than two years of fierce fighting against the Nazi invasion has aroused among the people of the United Nations a desire to know more about the Soviet health program. The author lived in the Soviet Union for almost two years and in this booklet shows how the Soviets have made health a community matter. It is a very interesting account and is well worth reading.

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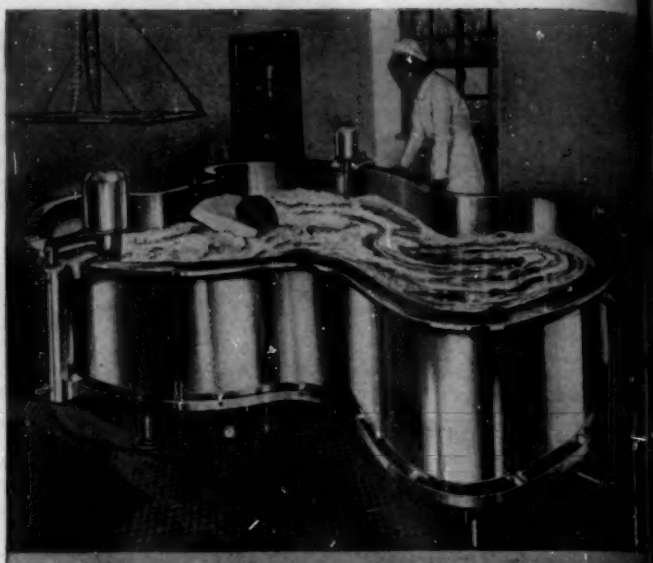

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